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February 1994

ORGANIZATIONAL REPORT

Bureau of Land Management
Wyoming

Skills & Skills Mixes for Managing Ecosystems

Prepared by
Ecosystem Skills Study Team

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ORGANIZATIONAL REPORT
SKILLS AND SKILLS MIXES NEEDED FOR MANAGING ECOSYSTEMS

Prepared by

Ecosystem Skills Study Team
Bureau of Land Management
February 1994

EXECUTIVE SUMMARY

The study team members held discussions with individuals representing various interests, agencies, and BLM groups to determine, from an operational standpoint, the skills needed to conduct a viable program of ecosystem management at the local level. The goal of this effort was to provide management with information that can be used for planning the organization, staffing, training, and other requirements of the program.

Five teams comprised of two or three skills study team members (Page 6) held 58 discussions with approximately 130 individuals from State government, Federal agencies, universities, and other interested parties (Appendix C). The results of these discussions were compiled and consolidated into this report. Appendices B and D contain recommendation and discussion summaries.

Findings indicate additional skills are needed in various occupations concerned with landscape ecology, sociology, economics, communication, and facilitation. BLM needs specialists who can work effectively on interdisciplinary teams, visualize the big picture, and understand ecological relationships. Also needed are current baseline data on the condition and composition of the various components of the ecosystems in order to effectively measure and assess the impact of change. Partnerships with the academic community, other governmental agencies, and other interested parties are necessary to network data collection, to conduct monitoring, to share information, and to understand the overlapping jurisdictional requirements of ecosystem management.

Respondents felt that BLM in Wyoming currently has many of the technical skills and specialists needed to implement ecosystem management. For the most part, the existing staff will continue to be necessary. Skill deficiencies that must be filled include the role of the landscape ecologist, the mathematical modeler, the public outreach specialists, the data managers (GIS), and the social and economic specialists. A more specific summary of needed occupational skills is provided in Table 1.

Organizational aspects that could complement a transition to ecosystem management include developing better business practices, moving more staff to field oriented positions, developing mission or vision statements, and empowering the field level to do their job more effectively. BLM's management orientation must change to be centered on ecosystems as a basic management unit rather than on traditional programs and political boundaries.

INTRODUCTION

Purpose

This report is prepared for the Wyoming Management Team to provide recommendations regarding skills and skills mixes needed to conduct ecosystem management at the local level in Wyoming. The report identifies and analyzes the skills needed at the ecosystem level for management of lands and resources to effectively implement BLM's national ecosystem management initiative.

Background Information

Ecosystem

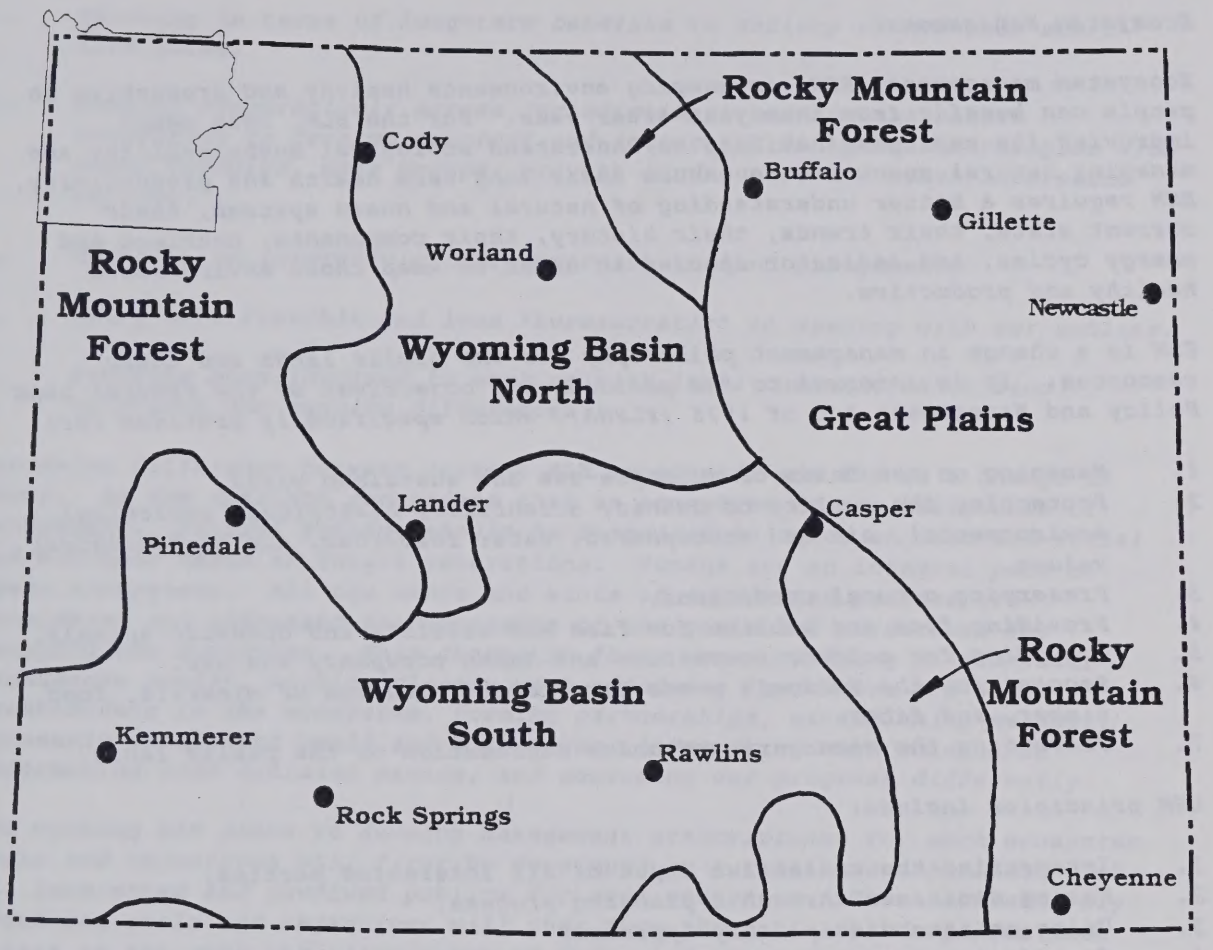
In simple terms, an ecosystem (ecological system) is the place where the interaction between living things and their environment occurs. The ecosystem concept brings biological, physical, social, and political worlds together into a holistic framework within which all systems can be described, studied, and managed.

The study team reviewed the major publications on ecosystem and ecological region (ecoregion) delineation by experts such as R. G. Bailey with the Forest Service, J. M. Omernik with the Environmental Protection Agency, along with earlier publications by A. W. Kuchler on the vegetative provinces of Wyoming and N. W. Fenneman's work on physiographic regions. These experts provide a clear understanding of ecosystem and ecoregion delineation concepts on a regional or provincial scale and where they lie in relation to Wyoming's natural resources. The study team has used their ecoregion and ecosystem delineation criteria to depict Wyoming's ecoregions.

There are three basic provinces or ecoregions in Wyoming as shown on Map 1, Wyoming Ecoregions. They include: the Great Plains grassland province, extending north to south along the eastern part of the state; the Rocky Mountain forest province, comprising the major mountain chains in the state; and the Wyoming Basin province. The sagebrush-dominated Wyoming Basin province is divided into north and south sections by the lower extensions of the Absaroka Range (the Owl Creek Mountains) and the southern end of the Bighorn Mountains (the Bridger Mountains). These provinces are essentially the geomorphic regions of the State, each supporting independent surface biotic (living) and abiotic (non-living) complexes.

BLM Wyoming has been working with the University of Wyoming to establish criteria for delineation of ecosystems within the ecoregions of the state. This has led to an understanding of ecosystems on a landscape level as recurring land patterns that have a biophysical coherence. Landscape ecology is an all-encompassing approach that integrates land forms, vegetative types, living organisms, and human land uses and studies the interrelationships within the context of a "landscape complex". These land units are operationally defined as containing predictably recurring terrain features which typically contain relatively homogeneous assemblages of biotic species.

Wyoming Ecoregions



Map 1

Ecosystem Management

Ecosystem management (ESM) is keeping environments healthy and productive so people can benefit from them year after year. For the BLM, this means improving its employees' ability to understand ecological sustainability and managing natural resources to ensure their long term health and productivity. ESM requires a better understanding of natural and human systems, their current state, their trends, their history, their components, nutrient and energy cycles, and indicator species in order to keep those environments healthy and productive.

ESM is a change in management philosophy for the public lands and their resources. It is integral to the policies and objectives of the Federal Land Policy and Management Act of 1976 (FLPMA), which specifically provides for:

1. *Managing on the basis of multiple-use and sustained yield.*
2. *Protecting the quality of scenic, scientific, historical, ecological, environmental, air and atmospheric, water resources, and archeological values.*
3. *Preserving natural conditions.*
4. *Providing food and habitat for fish and wildlife and domestic animals.*
5. *Providing for outdoor recreation and human occupancy and use.*
6. *Recognizing the Nation's needs for domestic sources of minerals, food, timber, and fiber.*
7. *Preventing the necessary and undue degradation of the public lands.*

ESM principles include:

1. *Integrating the collective input of all interested parties.*
2. *Making decisions through a planning process.*
3. *Using an interdisciplinary approach.*
4. *Considering long term goals.*
5. *Managing landscapes for long-term productivity for future generations.*
6. *Maintaining sustainability of resource values and uses.*
7. *Using scientific information.*
8. *Maintaining biological diversity.*
9. *Minimizing impacts.*

BLM's ESM initiative is based on several principles outlined in its concept paper, <u>ECOSYSTEM MANAGEMENT IN THE BLM - FROM CONCEPT TO COMMITMENT</u>, including:

1. *Working with nature and learning to live within the limits of healthy natural systems by looking at the whole picture and all the influences on these systems.*

2. *Improving our scientific understanding of how conditions are changing and using this information in making decisions.*

3. *Minimizing and repairing damage to lands and resources.*

4. *Thinking in terms of long-term benefits to society rather than short-term gains.*

5. *Working cooperatively across jurisdictional and administrative boundaries to develop coherent and integrated management strategies with other agencies, user groups, private landowners, and other interested parties.*

6. *Adopting an interdisciplinary approach to land management.*

7. *Being more flexible and less "bureaucratic" in dealing with our publics.*

8. *Becoming more involved in working with local communities to find solutions and resolve differences.*

The major difference between current BLM management and ESM is a change in focus. An ESM approach recognizes that an ecosystem is the basic unit of management. Natural systems should be sustained in order to meet the social and economic needs of future generations. Humans are an integral part of these ecosystems. All the needs and wants of interested parties are considered and addressed as components of the goals and objectives for managing the ecosystem. This change in focus means managing on a broader "landscape scale", working closely with adjoining landowners and other stakeholders in the ecosystem, forming partnerships, establishing mutually agreeable management goals and objectives, integrating more scientific information into decision making, and measuring our progress differently.

The Wyoming BLM plans to develop management prescriptions for each ecosystem. Goals and objectives will first be developed in a collaborative effort with all interested and involved publics for each ecosystem. These collectively developed goals and objectives will then form the basis for decisions that relate to the uses and allocations of Federal lands and minerals in support of the collective goals and objectives. The publics will therefore have a role in making decisions regarding how the resources on the Federal and other governmental lands within the ecosystem will be managed, as well as on their own non-Federal lands.

Goals and Objectives

The goal of the Skills Assessment Study Team was to determine, from an operational standpoint, the skills needed to conduct an effective program of ESM at the local level and to provide management with information for planning the organization, staffing, training, and other requirements of ESM.

The Team's objectives were to:

Identify activities and processes at the field level that will change under ESM.

Determine what skills are required to carry out the activities and processes that will occur with an ESM approach.

Determine the most appropriate mix of skills necessary for conducting ESM at the field level in Wyoming.

Find out how various public interests, other agencies and BLM groups perceive ESM and what type of field organization they feel will be needed to implement the program in Wyoming.

Procedure

An Ecosystem Skills Study Team was formed to prepare the Skills Study Report. Team members were selected from various BLM organizations throughout the state, each for their experience in dealing with people and their knowledge of BLM programs and activities.

The team's first activity was a brainstorming session to come to a common understanding of ESM, to define the objectives of the skills study, and to determine a methodology for collecting information and presenting it to the Wyoming Management Team.

The Study Team broke into five small teams that would meet with officials and personnel from selected State and Federal agencies, Universities, and BLM organizations to discuss ecosystem management skill needs:

Team 1	*Joe Vessels*	*Area Manager*	*Worland DO, Grass Creek RA*
	Steve Christy	*Forester*	*Worland DO*
Team 2	*Bill Mortimer*	*Area Manager*	*Casper DO, Platte River RA*
	Jon Johnson	*Env. Spec.*	*WSO, Branch of P & EC*
Team 3	*Bernie Weynand*	*Supervisory NRS*	*Rock Springs DO*
	Bill Watters	*Supv. M-Res.Spec.*	*Rawlins DO, GDRA*
Team 4	*Mark Gorges*	*Fisheries Biol.*	*WSO, Br. of Biological Res.*
	Vickie Daniels	*Env. Sci. (Geol.)*	*WSO, Br. of Fluid Minerals*
Team 5	*Bill Daniels*	*Supv. P&EC Spec.*	*WSO, Br. of P & EC*
	Don Roberts	*Class'n Spec.*	*WSO, Staffing Section*
	Tom Lahti	*Landscape Arch.*	*WSO, Br. of Engineering*

The team then developed two discussion questions:

1. *"What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?".*

2. *"What professional skills or mixes of skills do we need to manage the lands and resources administered by BLM?".*

The study team contacted individuals and groups prior to discussions and provided them with a handout explaining BLM's approach to ESM under FLPMA (Skills Study Handout - Appendix 1). This gave the group or the individual time to consider their responses before discussions with study team members.

DISCUSSION RESULTS

The five teams held 58 discussions involving about 130 individuals from different organizational settings and viewpoints. These discussions produced an array of comments and suggestions. Appendices B and D contain discussion summaries and comments. Responses from these discussions are summarized in four categories: State Government, Federal Agencies, Universities, and Other Interested Parties:

State Government

The teams held discussions with 25 people in 13 different offices of State government departments. Topics discussed within this group included internal coordination, interagency coordination, public education, more monitoring/inventory, communications and public skills, cross training, clarity of mission and goals, interdisciplinary coordination, and interagency teamwork.

Of particular interest to State officials is for BLM to decide what business we are really into before we begin to improve it (i.e., define ESM and how it compares to current management). Then, involve the public in order to provide information showing that the change in direction will be for everyone's benefit over the long term. BLM also needs to develop and maintain close working relationships with the various stakeholders and media representatives with whom we interact. There is a need for a combination of good people skills to complement natural resource skills.

Specific skills that were emphasized by the state government interviewees included: ecology (systems and plant), landscape ecology, landscape architecture, facilitation, team building, people skills, conflict resolution, recreation, sociology, archeology, demography, natural resource economics, GIS understanding, legal interpretation, strategic planning, public relations, engineering, soils, and hydrology.

Federal Agencies

The teams held discussions with 43 individuals in 26 different offices outside of BLM. Topics of interest to this group included: ability to bridge organizational hierarchies, facilitation and conflict resolution skills, need for ecologists, data gathering and monitoring, budget flexibility, interdisciplinary teams, communications skills, data transfer, interagency planning and sharing of skills, contracts with universities, GIS, legal compliance and appeals, public outreach, and public education.

Federal agency contacts emphasized the importance of maintaining a scientific basis for the decision making process when involving external stakeholders. There is also some concern regarding BLM's ability to assimilate a truly interdisciplinary team concept wherein the members understand and work in recognition of the big picture. There is a need for both specialist and generalist personnel to be able to deal with both local and "big picture" concerns. Another strong recommendation is that BLM could effectively use external resource expertise through more partnerships with universities and with other agencies and organizations.

Discussions were held in four BLM offices representing three states. Most of the topics discussed with other groups also surfaced in these discussions. There was a consensus in this group that BLM already has most, but not all, of the needed skills on board. BLM just needs to utilize them more effectively and concurrently improve its relationships with external parties and entities. Internally, BLM personnel need to work in a more collaborative manner rather than in competition with one another. BLM's budget and resource programs are prime illustrations of this internal competition. One manager commented "...Often each subactivity has been allowed to do these things in their own pet areas and then yell at each other for lack of coordination."

Some specific skills that were recommended by this group included: general ecology, landscape ecology, systems ecology, plant ecology, soil science, microbiology, population biology, hydrology, climatology, integrators, facilitators, archeology, anthropology, paleontology, sociology, demography, economics, geophysics, GIS specialists, remote sensing and imagery, and public affairs.

Universities

Discussions with academic faculty were held at Colorado State University, the University of Wyoming, and Montana State University. These involved 10 different offices and at least 17 individuals. Topics of emphasis or concern included: communications and people skills, methods of allocating money and awards, conflict management skills, use of models, monitoring and trend analysis, more agreements with universities, evolution from multidisciplinary groups to interdisciplinary teams, use of technicians for technical work, the need for general type ecologists, geographic information systems (GIS) specialists and data, integration of systems, developing personal linkages, and social-economic concepts.

Several of the university faculty expressed an interest in working with BLM on a contract basis utilizing graduate students or part time professors. There were also indications that graduate students in some fields might be available for seasonal volunteer work. Some of the professors indicated that State (land grant) universities might well serve as information centers or hubs for data from various Federal, State, local and other stakeholders regarding different land and resource management concerns. Colorado State University is in the process of centralizing natural resource information systems data, including GIS data, for the State of Colorado. BLM should consider a similar initiative in Wyoming.

Many professors provided suggestions regarding the use of data and systems prediction models to provide a basis for forecasting and analyzing impacts. Other topics included use of adaptive feedback systems and the use of GIS in various components of natural resources information systems. GIS graphic databases provide useful analytical tools for comparing resource information with geographic spacial information.

Skills recommendations emphasized by this group included: taxonomy, general ecology, landscape ecology, restoration ecology, fire restoration ecology, weed science, social science, climatology, planning, political skills, teamwork, data management, botany, range ecology, pest control, and restoration ecology.

Other Interested Parties

Discussions were also held with representatives of Park County, Natrona County, and the Rocky Mountain Oil and Gas Association. Discussion topics included: interagency coordination and skill sharing, the need for more people to do field work, strategic planning, skills present now, importance of outreach education, need for close local coordination, need for standardized baseline resource data, and use of universities for various types of expertise.

This group emphasized that ESM means closer coordination with local planning efforts and building and sustaining public trust through information sharing and various outreach activities. This group also reinforced the need for up-front education of the public and other interested parties about what BLM is doing.

RECOMMENDED SKILLS

The skills needed for the management of natural resources from an ecosystem perspective are displayed in Table 1. They are grouped by types of positions and level of need in the field. Full time refers to positions and skills that are needed full-time at the local level for direct field implementation of ecosystem based management. Part time/zoned are those positions and skills needed at the local level for direct field implementation of ecosystem based management, but not necessarily full-time in each field unit. Part-time skills may be "dual hatted" with other field unit positions. These "dual hat" field unit positions may be full-time positions covering a zone of field units, seasonal positions, or in positions that have some field implementation responsibilities along with policy and budget duties. Skills in the occasional category are needed only occasionally or in an advisory or consultive capacity to address unique situations and provide overall direction for management. Some of these skills may be available from other agencies, universities, private consultants, or other sources outside BLM. Some needed skills may warrant Bureau-wide, region-wide, or state-wide positions.

Current BLM management emphasis is on sustaining natural systems for current and future generations. Therefore, certain positions are needed that relate to understanding ecosystems in general. In the management category, the

Table 1 - Positions Based on Skills Needed at Local Level Under the Ecosystem Management Concept

	Social/political/economic	Biological/physical	Management	Support
FULLTIME	External Affairs Specialist Environmental Education Specialist Outdoor Recreation Planner Archeologist	Reclamation Ecologist Petroleum Engineer Petroleum Eng Tech (I&E) Geologist Range Ecologist Wildlife Specialist Range Management Specialist Range Technician Environmental Protection Spec Environmental Scientist	Landscape Ecologist Ecosystems Manager	GIS Specialist Land Adjustment Specialist Office Manager Data Manager Computer Assistant Compliance Specialist Law Enforcement (Ranger) Resources Clerk/Assistant Land Law Examiner Administrative Assistant Realty Specialist File Clerk Data Transcriber Civil Engineering Tech
PARTTIME/ZONED	Economist Sociologist Landscape Architect Wilderness Specialist Wild and Scenic River Spec	Plant Ecologist Botanist Fisheries Specialist T&E Specialist Hydrologist Soil Scientist Geomorphologist Fire Management Specialist Wild Horse Specialist Hazardous Materials Specialist Silviculturalist Forest Ecologist Weed Management Specialist Paleontologist	Ecosystems Planner Ecoregion Manager	Facilitator Environmental Law Spec Photointerpretive Spec Funding Source Specialist Computer Specialist Personnel Specialist Volunteer Coordinator Remote Sensing Specialist Minerals Clerk Appraiser Fire Control Technician Budget Analyst Procurement Specialist Supply Technician Records Clerk EEO Specialist Civil Engineer Engineering Equip Operator Land Surveyor Mining Engineer Training Coordinator
OCCASIONAL	Historian Anthropologist (Native American cultures) Geographer Demographer Psychologist	Restoration Ecologist Ecological Historian Environmental Engineer Entomologist Air Quality Specialist Water Quality Specialist Climatologist Aquatic Biologist Fire Ecologist Toxicologist Ornithologist Herpetologist	State Director	Field Solicitor Systems Modeler Negotiator Water Rights Specialist Geodesist Cartographer Computer Programmer Statistician Drafting Specialist Illustrator Photographer

Full Time == skills needed on a daily basis Part-time/zoned == can share with other organizations Occasional == advisory or consultant basis

ecosystem manager would equate to the current area manager level. At the ecoregion level, the current District Manager would approximate that level of management. The ecosystem manager is the local level, full time management position listed. The other management levels are part-time or occasional at the ecosystem or local level.

The knowledge needed to evaluate the state of health, trends, indicators and socio-economic influences on the ecosystems are not emphasized in BLM Wyoming's current TO. Assuming no additional FTE, these knowledges or skills can be acquired in new personnel hired to fill positions vacated through attrition. The landscape ecologist should be full time in any ecosystem management scenario at the local level. The ecosystem modeler is only needed on a occasional basis, but is an essential position or skill. The environmental education specialist is also an important position or skill needed only part time and could be combined with the external affairs function. There is also a need for a full time facilitator, although not at the local level. The need for GIS specialists and general GIS understanding is well recognized and was mentioned in most interviews. The need for further socio-economic expertise was also heavily emphasized. Restoration ecology is a skill need that should be fulfilled, but again not at the local level. The same can be said for the ecological historian. This expertise will help us understand historical trends in an ecosystem as they relate to the current health of the system.

Figure 1 illustrates the establishment of goals and objectives, decision making, and ecosystem data and decision flow expected with ecosystem management at the local level. As shown in the figure, the organization does not have some of the positions represented by the boxes where the collection of data, flow of data, management of data, and interaction on a systems knowledge basis occur under ESM. The slots that are missing in the organization are the landscape ecologist, the mathematical modeler, the GIS specialist (although we have some in place at the district or resource area), and public outreach/environmental education specialist.

Not all skills currently on the TO for the State at the Resource Area level are present in Table 1. However, the table reflects most of the skills necessary for the diagrammed process. Skills currently missing at the local level could be provided by hiring new personnel, filling vacancies with personnel having these skills, or by assigning present BLM employees with the appropriate skills to these positions.

GENERAL RECOMMENDATIONS

The people with whom the team discussed skills and skills mixes made many general observations and recommendations concerning the transition to ecosystem based management in addition to specific skills recommendations. Their recommendations pertained to general types of professional skills needed, interpersonal skills that most personnel need to develop, training needed to acquire these skills, BLM planning perspective and process, a coordinated approach to understanding ecosystems and ecosystem based management, data needs and management, interagency and public interaction, and BLM policy and procedures.

Data Collection
and
Decision Making at the Local Level
for
Ecosystem Management

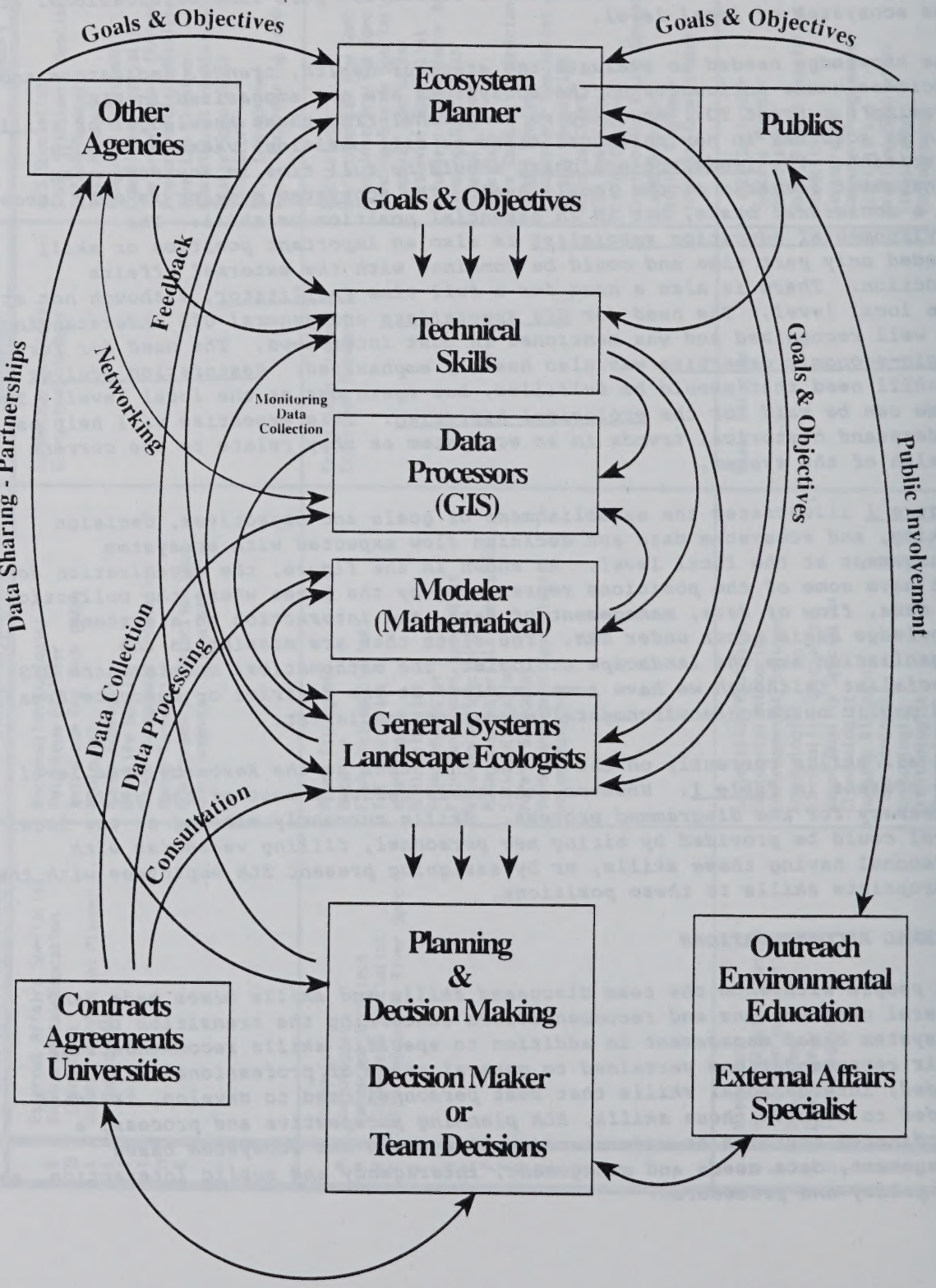


Figure 1

Professional Skills

Many suggested that BLM needs to maintain its traditional professional skills, expertise, and roles. Along with the addition of some specific skills, they stressed that BLM needs professionals who can take a large scale view of an ecosystem and understand what is happening within the systems involved. Promoting the professional expertise that BLM has, and thereby enhancing its credibility, will better enable BLM staff and managers to interact with others and be effective within the legal system.

Many felt that BLM needs more "generalists" to look at the overall ecosystem. However, BLM specialists also must develop a more holistic view of resource management while still retaining their specific expertise. Minimizing "dual-hating" and the development of broad scope "functionalist" positions were stressed. While the land management agencies are looking to "good science" for input on decisions, they should staff with professionals oriented toward application and coordinate with universities and research agencies for research needs. A strong orientation toward automated systems is an essential skill for all BLM professionals.

An organizational move to increase field staff would enhance BLM's efforts towards ecosystem based management. Scarce skill professionals must be available for on-the-ground work. Apprenticeship-type programs could be effective in maintaining continuity in scarce skill programs. Cautions were also offered on eliminating middle-management positions and expecting field specialists to pick up the management work load. Any organization structure must be flexible enough to deal with evolving national policies and legal mandates.

Interpersonal Skills

Table 2 lists the interpersonal skills that would be needed by most BLM employees to manage resources under the ecosystem management concept. The natural resource management field today demands improved communication skills for all involved. Basic skills such as public speaking, one-on-one conversation, listening, technical writing, and effective use of the telephone are essential for every professional. With our business focusing more on people, an increased awareness and sensitivity toward human needs, mutual respect and trust, and multi-cultural differences is essential. New employees need to understand the Western culture and environment in order to incorporate the human factor into ESM.

All those involved in natural resource management must expand their perspective to view the entire ecosystem. Hence, there is a growing need to hire professionals with the abilities to conceptualize this broader perspective, to integrate and analyze the complex relationships, and to develop creative solutions to challenging situations. These skills, along with the ability to learn from constructive criticism and failures, must be encouraged and developed in all BLM staffs.

With broader based staffs internally, and increasing involvement with other agencies and outside groups, developing skills in team participation,

facilitation, idea generation, consensus building, and collaborative decision making are necessary to be effective. Proactive salesmanship skills, with a win-win perspective, will be necessary to bring all those involved into a constructive group forum. These skills include negotiation, political awareness, conflict resolution, and a personable approach.

Strong leadership skills are important in any organization. With natural resource management becoming increasingly complex and involving more interests, developing leadership skills is even more essential. Leaders at all levels from field interdisciplinary teams to upper management must be able to direct, coach, encourage, and facilitate diverse groups to define missions and goals and to make difficult decisions. Leaders must encourage an acceptable level of risk taking and accept occasional failures.

Table 2 General skills needed by BLM employees to manage effectively at the ecosystem level.

leadership	communications skills	automation skills
team dynamics	public speaking	use of models
interdisciplinary coordination	one-on-one speaking	computer skills
	listening	GIS skills
internal coordination	technical writing	data transfer skills
interdisciplinary teamwork	telephone use skills	biodiversity skills
	facilitation	cumulative impact analysis skills
interagency coordination	conflict resolution	
	negotiations	ecosystem analysis skills
interagency teamwork	consensus building	
strategic planning	collaborative decision making	socio-economic analysis skills
continuing education	public education	applied economics
cross training between disciplines	outreach	political awareness

Training

Continuing education and cross training of BLM's existing staff could provide some of the specific skills needed that were identified through this study. A number of those skills currently are not found in BLM in Wyoming. These would best be filled with individuals specifically educated in that field. Most of the general skills stated above, such as conflict resolution, facilitation, communication, team dynamics, and strategic planning, could be developed in BLM employees through in-house training and workshops. Skills specific to BLM's mission such as ecosystem science, applied economics, cumulative impact analysis, and biodiversity can readily be developed through existing training sources such as the Phoenix Training Center, universities, and private vendors, or - at least on an elemental level - through in-house training.

Planning

A major component of BLM's transition to ecosystem based management must be a change in its planning perspective. Naturally, planning must focus more on specific ecosystems, but on a larger scale than has been traditional. BLM must understand and describe current and desired future uses (desired future condition) from the perspective of sustainability (what is the land capable of sustaining), economic feasibility, and suitability (by social criteria). Taking a holistic approach to planning, analyzing landscape gaps, and understanding the history of the ecosystem should help ensure sustainability of biodiversity and long-term system health.

Strategic planning on an ecoregion basis crossing political boundaries should be a primary emphasis of ecosystem based planning. Adjacent ownerships should be managed under common goals and objectives, taking into consideration the private land owners' desires. Interdisciplinary activity plans, on a local basis, should replace overlapping single program plans and be combined with other landowners' and agencies' plans.

Planning team interaction is critical to the success of ecosystem based planning. Along with BLM staff specialists, these teams should include other agency specialists, interested organizations, and private landowners with everyone on an equal footing. It is beneficial to utilize the most experienced personnel for strategic level planning. Continuing planning teams as monitoring teams would provide some level of consistency.

Several people suggested that BLM proceed slowly and carefully with implementing ecosystem based management so that all interested participants are brought along with the process. Involving all specialists and interests in ecosystem boundary delineation is a critical step. These planning teams should have well defined mission statements at all levels of the organization and work together to identify common issues, goals, and objectives.

A planning process must first be followed in implementing ecosystem based decisions to insure appropriate public involvement, evaluation of a broad range of alternatives, and consideration of cumulative impacts. The traditional planning process and role will be reoriented toward ecosystems and ecoregions, but the importance of the process cannot be overlooked. This is the next phase or generation of planning in the Bureau.

Coordination of Ecosystem Understanding and Boundaries

An important initial phase in ecosystem based planning and management must be to agree on a good definition of ecosystems and develop criteria for establishing ecosystem boundaries. Before people can intensively manage ecosystems, they must understand them. This includes the indicators of system health and productivity; the processes and linkages involved (e.g. nutrient cycling); and the measures of sustainability, biodiversity, and cumulative impacts.

Agreement upon the type or types of resource and other data needed to manage ecosystems will help develop a common understanding of such systems. Coarse

filter (generalized) data is usually available, but fine filter (specific) data is frequently lacking. Acquiring the fine filter data is also very expensive. Ecosystem modeling and computer simulation technology is being developed and could allow the "what ifs" to be analyzed. This technology and the skills to use it must be available to the Bureau.

The ecosystem concept is evolving in Wyoming toward an understanding at the ecoregion level and, more recently, at the landscape complex level. Landscape level planning - a broad perspective of the region and its geographic makeup - will be an appropriate level of detail for the comprehensive, Resource Area Management Plan, type decision making. Activity level planning is a more appropriate process below the landscape level of planning. A "manageable" ecosystem must be a geographic area of relatively uniform makeup so that management prescriptions can be prepared for the Federal lands and minerals in support of the broader goals and objectives collectively obtained from the interaction of all interested parties in the area.

Data Needs, Collection, and Management

Standard criteria for baseline data becomes essential when many players are involved. Recognizing the data that is available and acquiring it from all sources could meet many of the data needs. There is a general feeling that, overall, the natural resource agencies do not have adequate inventory data for many programs. However, until all data sources are tapped, the gaps cannot be fully identified. There are many potential sources from which BLM can acquire new data in lieu of trying to collect it with chronically short, agency funding. Universities (especially graduate students), agreements and contracts with private organizations, and close coordination with other agencies could provide much of our data needs. BLM must also coordinate monitoring efforts between programs, disciplines, and agencies to maintain the databases.

The management of data is critical to its usefulness. A great mass of data will be accumulated by BLM and shared with the other agencies and interests. Common automation hardware and software will better ensure availability, use, and maintenance of data. GIS expertise must be developed and maintained at all levels of the organization to build and maintain data bases. Modeling will help with data interpretation and recognizing data needs, but it should be kept as simple as possible. The development of data analysis models should be contracted out to experts. BLM should focus on the data inputs and analysis results.

Agency Interaction

There are numerous opportunities to use other agency expertise and to share our skills to fill current needs. Maintaining partnerships with private organizations and scientific connections with universities and research agencies can facilitate better coordinated and more scientific management. Agencies need to work toward more common and consistent regulations, policies, and procedures for this to be effective.

Data sharing is an important facet of agency interaction. This could be enhanced through joint planning, common systems, and consistent terminology. BLM should recognize that other agencies may be the best repository for certain data.

Other opportunities for coordination between agencies are in training, organizational structure analysis, automation, formal and informal information sharing, and a general attitude of working together. Common objectives along with trust and mutual respect are necessary for this to happen.

Public Interaction

Ecosystem based management demands much more effective interaction with the public. Information should be continuously provided to the public about what BLM is doing and how they can be involved. This need is growing to the extent that field offices should have an individual dedicated as a liaison with the public or a community coordinator. Information should flow both ways with BLM educating the public and learning from the public. An effective public outreach program should help to dissipate the government "big brother" image that some hold. BLM should be showcasing our successes and working to alleviate fears that ESM is an effort by the Federal government to take over private lands.

Public interaction should include both informal and formal networking. It is important for all levels of the organization to understand that it is acceptable to talk to the public. To keep the human side of the system in the picture BLM must maintain these relationships through open, honest dialogue. Effective use of communication technology and making BLM planning and environmental documents readable and understandable will go a long way toward this end. Meeting groups on their own turf, funding their travel to meetings, being cognizant of timing, and recognizing who you are dealing with will also help make public interaction effective.

An important part of strengthening BLM's public outreach program is the need for common understanding and language for more effective communication with the various interests. An environmental education program is needed to inform concerned publics what BLM's ESM program is all about and why it is important. This education program is needed to show that BLM's ESM initiative is not an attempt to take over management of private lands.

Policy and Procedure

BLM's budget policies and procedures were the subject of many suggestions. Many felt that BLM needs to move from program based budgeting to a simpler, more flexible system. A common, integrated funding system among natural resource oriented agencies would do a lot to facilitate such things as skill sharing, data sharing, and joint planning and plan implementation.

Many suggested that streamlining its regulations would make BLM a more effective partner in managing ecosystems. BLM should closely monitor pending legislation and understand how it will influence agency policies. Some more encompassing national policies, such as a clear national energy policy, would clarify BLM's overall direction. Many expressed the need for policies that reflect a balance between conservation and development. Respondents also recognize that much of what BLM authorizes and does is mandated by statute.

Organizational changes that could complement a transition to ESM include developing better business practices, moving more staff to field oriented positions, developing mission or vision statements, and empowering field level personnel to do their job more effectively.

SUMMARY AND CONCLUSIONS

This skills study is part of an initial effort in implementing ESM principles in Wyoming BLM's programs and activities. The goal was to obtain suggestions and recommendations regarding the appropriate skills and skills mixes BLM needs to move toward implementing ESM. The study team initially discussed this with representatives from educational institutions and from Federal, State, and local governmental entities to hear their thoughts and advice. Input from the wider public land users, interest groups, and other non-governmental entities and individuals may occur at a later date. These representatives provided a great deal of insight into problems, shared common perspectives, and offered many constructive suggestions and ideas. Their suggestions and recommendations corroborated the study team's expectations regarding ecosystem management skill needs.

BLM currently has most of the professional and technical skills and specialists needed to implement ESM: wildlife biologists, foresters, rangeland management specialists, archaeologists, geologists, et al.

BLM needs systems-oriented people - people with a holistic perspective - who understand ecosystems and ecosystem health, functions, trends, history and reactions to activities outside and within the ecosystems.

Data management, including analytic and automation skills, and a good grasp of an effective GIS system are essential to ESM.

BLM needs people who have the skills to effectively involve interested publics in collective planning, goal setting, and decision making processes. Clear and timely communication with these publics to assure mutual understanding of goals and objectives will require competent and effective external affairs and environmental education specialists. Additional social, economic, cultural, and political expertise is needed to gather information, monitor conditions and trends, and to analyze such information, conditions, and trends in order to better understand local and regional cultures, communities, and economies.

Most of the persons interviewed mentioned that BLM managers and specialists need to have good interpersonal skills. These skills are fundamental. They facilitate and complement all the others. Some of those interviewed felt that many professionals chose the natural resource management profession because they are more comfortable working with resources than with people. One resource management supervisor commented that he felt many resource specialists are "anti-social", and that he would rather hire people with good interpersonal skills and then teach them resource management. Better collaboration skills to effectively establish ESM goals and objectives with other land owners, managers, and users is a part of this need for interpersonal skills.

BLM must undertake a substantial effort to provide inhouse ESM training for its personnel as concepts are clarified and definitions established to promote a regional and landscape level of ecosystem understanding.

Many people in the academic community have a good understanding of ecosystems and what constitutes an ESM program. They do not necessarily have that understanding of BLM programs, but many of them have been involved in making major contributions to ESM principles and procedures. BLM should form close working relationships with those in the universities having skills and experience needed in all aspects of ecosystem science. This is an excellent source of data and data collection expertise that the agency should utilize.

Implementing ESM will require that BLM:

1. *Shift our management orientation from programs to ecosystems.*

2. *Involve our publics in the early stages of the collective planning, goal setting, and decision-making.*

3. *Show stakeholders how their support of ESM will benefit them.*

4. *Employ systems-oriented people who know how to keep ecosystems healthy.*

5. *Use social, political, economic, and cultural expertise to analyze and evaluate local economies, regional economies, and local and regional cultures to better understand them so that these systems can remain viable.*

6. *Employ mathematical modeling tools to help evaluate and understand ecosystems and their interrelationships with economic and other systems.*

7. *Select proactive managers and specialists who understand ecosystems and know how to manage them.*

8. *Emphasize communication with all publics and technical understanding in external affairs and environmental education activities.*

9. *Make land use planning an ongoing rather than cyclical activity.*

10. *Do something on-the-ground to demonstrate that BLM intends to do more than just talk about ESM.*

BUREAU OF LAND MANAGEMENT
SKILLS MIX STUDY

APPENDIX A

SKILLS STUDY HANDOUT

Introduction

Natural resource management concepts are changing. Evolving demands and increased understanding of the environment is driving a reassessment of how business is conducted. An ecosystem management approach recognizes that the ecosystem is a basic management unit. Natural systems should be sustained in order to meet the social and economic needs of future generations, and humans are an integral component of these ecosystems.

A part of this approach is involving all interested parties in collective goal setting, planning and decision making. In considering an integrated approach to resource management, the BLM will continue to meet the mandates of the Federal Land Policy and Management Act of 1976 (FLPMA) by:

-managing on the basis of multiple-use and sustained yield.
-protecting the quality of scenic, scientific, historical, ecological, environmental, air and atmospheric, water resources, and archaeological values.
-preserving natural conditions.
-providing food and habitat for fish and wildlife and domestic animals.
-providing for outdoor recreation and human occupancy and use.
-recognizing the Nation's needs for domestic sources of minerals, food, timber, and fiber.
-preventing the unnecessary and undue degradation of the public lands.

The Bureau will now accomplish these through the principles of ecosystem management, including:

-maintaining sustainability of resource values and uses
-using scientific information
-maintaining biological diversity
-minimizing impacts
-using an interdisciplinary approach
-considering long term goals
-managing landscapes
-decision making through a planning process.

Discussion Topics

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What professional skills or mixes of skills do we need to manage the lands and resources administered by BLM?

BUREAU OF LAND MANAGEMENT
SKILLS MIX STUDY

APPENDIX B

SUMMARY OF RECOMMENDATIONS

1 - INTERPERSONAL SKILLS

PEOPLE/AWARENESS/SENSITIVITY
- *avoid hiring "non-people people"*
- *trust - mutual respect - not just putting out info but personal interacting and feedback*
- *awareness training on the job - of others - internally an externally*
- *multi-cultural*

COMMUNICATIONS
- *presentation - public speaking*
- *telephone*
- *listening*
- *brainstorming*
- *role playing*

VISION/VIEWPOINT/PERSPECTIVE
- *conceptualizers -*
- *integrative skills - interrelationships*
- *macroscopic skills*
- *good analyst good thinkers*
- *creative intuitive generalists*
- *constructive criticism - revisit failures*
- *think generically - implement in detail*

GROUP DYNAMICS/PARTICIPATION
- *facilitation*
- *team participation*
- *collaborative decision making*
- *working with boards - group mentality*
- *team participation is the best teacher*
- *consensus building*
- *idea generating skills*

WIN-WIN SALESMANSHIP
- *being proactive - networking - need the "we-we" orientation of marketing*
- *salesmanship*
- *political*
- *negotiations*
- *how to deal with users*
- *collaboration*
- *conflict resolution - regulatory differences*
- *public contact*

TECHNICAL
- *regulatory*
- *analytical skills*
- *resource protection*
- *computer literacy*
- *automation*
- *technical writing - simplified - concise*
- *problem solving skills*

LEADERSHIP
- *management encouraging risk taking and accepting failure*
- *interdisciplinary team leadership skills*
- *hand holding*
- *decision making skills*
- *management skills - better supervisory coaching skills - missions, goals, technology*
- *cheerleading*
- *coaching*
- *people management*
- *leadership*

2 - DATA COLLECTION AND MANAGEMENT

DATA ACQUISITION
- *standardize criteria for baseline data*
- *the best plants for the intended use*
- *we are coordination rich and data poor*
- *pull in all the data sources*
- *not enough inventories - data*
- *need access to the research skills but have to remain application oriented*
- *contracting to other agencies*
- *adequate folks to do inventory and monitoring*
- *use graduate students to get inventories*
- *photography skills to document*
- *coordinated monitoring efforts*
- *multilevel monitoring with adaptive feedback*
- *working knowledge of ES is more important than complete inventories*

DATA USE, MANAGEMENT, AUTOMATION
- *better data management*
- *automated baseline inventories*
- *contracting to other agencies*
- *GIS expertise*
- *managing spacial data*
- *data base design skills, program application*
- *modeling ok - but lets try to make as simple as reasonable*
- *modeling maybe something we want to contract out - we work with the input/output*

3 - AGENCY INTERACTION AND DATA SHARING

SKILL SHARING/CONTRACTING
- use other agencies expertise
- need access to the research skills but have to remain application oriented
- use specialists from outside the agencies
- contracting to other agencies
- outside partnerships
- scientific connections
- SCS cadre of skills
- specialized - not in staff but gotten through the partnerships
- understand other agency programs

DATA/INFORMATION SHARING
- not enough inventories - data
- need joint planning and data sharing among agencies - GIS center - "shareware"
- contracting to other agencies
- scientific connections
- this process of talking to others has been a good discussion of sharing research agreements with Universities
- consistent terminology
- recognize that other agencies may be the best repository for certain data

COORDINATION/INTERACTION
- lots of interaction between agencies - sharing skills between agencies
- coordinate with other agencies for training
- others reorganizing but not asking outside folks for their input
- need joint planning and data sharing among agencies - GIS center - shareware
- internal interdisciplinary coordination etc, compliance - internal review of our actions
- need both the informal and formal networking - get word out to the troops that this is ok
- being proactive - networking - need the we-we orientation of marketing
- trust - mutual respect not just putting out info but personal interacting - feedback
- CRMP approach
- get everyone in on equal footing
- understand other agency programs
- common issue identification

COOPERATIVE/EFFICIENCY - PROGRAM/PROJECT SHARING
- monitoring strategies between agencies
- outside partnerships
- being proactive - networking - need the we-we orientation of marketing
- CRMP approach
- understand other agency programs
- cross political boundaries

4 - PLANNING

CONCEPTS/PERSPECTIVE
- *ecosystem based planning*
- *understanding current and desired future use/coordination*
- *sustainability - land capable of sustaining*
- *feasibility - economic feasibility*
- *suitability - social criteria*
- *insuring biodiversity in planning - need ecologists*
- *ecological planning*
- *take holistic approach - get away from tunnel vision*
- *keep man in mind in managing the ecosystem*
- *look at historical aspect of ecosystem - how did we get here*
- *landscape gap analysis*

LEVELS/WHERE/SCOPE
- *better strategic planning*
- *zoning*
- *cross political boundaries*
- *common mgmt plan for ecosystem - strategic plan - at least with BLM and FS*
- *interdisciplinary activity plans instead of overlapping single program activity plans*
- *coordinate (combine) activity level planning with FS*

TEAM/INTERACTION
- *involve others in planning process*
- *monitoring teams*
- *get everyone in on equal footing*
- *get private landowners and others on board as soon as possible*
- *use most experienced personnel in land use planning*

PROCESS/IMPLEMENTATION
- *no clear approach to plan implementation*
- *go slow with ESM*
- *involve all specialists in ES boundary delineation*
- *well defined mission statements for all levels of organization*
- *common issue identification*

5 - PUBLIC INPUT/INTERACTION

PUBLIC INPUT - OUTREACH/INFORMATION NEEDS

- *effective public input management*
- *need public contact person - information going both ways constantly*
- *community coordinator*
- *important that PR folks understand the data input*
- *getting public understanding - educating publics - get some positive PR skills and data*
- *need to dissipate the big brother mentality*
- *need to market - address the needs of others*
- *training our publics such as biodiversity - outreach programs - what is ESM*
- *keeping public informed*
- *showcase successes*
- *need to alleviate fears that ESM is feds taking over private lands*
- *promote that BLM has top level experts*

INTERACTION/TECHNIQUES/METHODS

- *need both the informal and formal networking - get word out to the troops that this is ok*
- *outside partnerships*
- *this process of talking to others has been a good discussion of sharing research agreements with Universities*
- *being proactive - networking - need the we-we orientation of marketing*
- *trust - mutual respect not just putting out info but personal interacting - feedback*
- *human side of system driving the picture*
- *using new technology to network telemarketing with clients*
- *marketing (BLM programs)*
- *be selective on who you work with*
- *timing for public input is important*
- *meet groups and users on their turf*
- *be open and honest with public*
- *make planning and environmental documents understandable/readable*
- *land users and interest groups agree on common goals*

SOURCES

- *different agencies, universities, groups looking for project areas for application*
- *scientific connections*
- *this process of talking to others has been a good discussion of sharing research agreements with Universities*
- *funding to bring interests to meetings*
- *hire university folks for inventory and monitoring - fund research*
- *technology centers tied to Universities*
- *contracting for surveys*
- *training in local economies*
- *exposure to user/interest groups*

6 - COORDINATION OF ECOSYSTEM UNDERSTANDING AND BOUNDARIES

COORDINATION NEED/RESULTS

- *good definition of ecosystems*
- *resolve ecosystem boundaries*
- *some agencies prefer watershed boundaries*
- *understanding the ecosystems that are being intensively managed*
- *understand indicators*
- *understanding processes and linkages - nutrient cycling*
- *well rounded ecosystem understanding*
- *ecosystems - sustainability, biodiversity and cumulative impacts*
- *vegetation manipulation - implementation*

PERSPECTIVE

- *what is reasonable - change our perspective - look at broader aspect*
- *human side of system driving the picture*
- *working knowledge of ES is more important than complete inventories*
- *work toward desired landscape condition*

PROCESS

- *involve all specialists in ES boundary delineation*
- *common issue identification*
- *coarse/fine filter data: coarse is available - fine is expensive to get*
- *detailed data collection*
- *ecosystem modeling allows the "what ifs" to be analyzed*
- *computer simulation - ecosystem holograms*
- *interpretation*

7 - POLICY AND PROCEDURE - BUDGET

BUDGET
- *need budget flexibility - too complicated*
- *to facilitate ecosystem management we must have integrated funding*
- *do away with budget based programs*
- *funding to bring interests to meetings*
- *budgeting*
- *common funding system with other agencies*

LAWS AND REGULATIONS
- *streamline regulations*
- *the legal system - how can we function in accordance with it - case law*
- *pending legislation influences our policies*

POLICY
- *national energy policy need*
- *management encouraging risk taking and accepting failure*
- *balance - conservation and development*
- *remember that much of what we do is by statute*

ORGANIZATION
- *branch of monitoring*
- *long on organization and short on field staff*
- *Business*
- *well defined mission statements for all levels of organization*
- *empower field level to job - first line decision making at local level*
- *vision statement for unit helps*

PROCESSES/PROCEDURES
- *move away from single specialists writing activity plans with other reviewing - go to ID teams more*
- *structure policies, procedures, programs on models that have worked (eg. paleontological after archaeological)*

8 - PROFESSIONAL SKILLS - STAFFING - HIRING

NEEDS - RESULTS
- *we still need traditional professional skills and roles*
- *need people who can take a grand view of what's happening, on a large scale, in a an ecosystem*
- *maintain expertise*
- *credibility for that interaction and court litigation*
- *the legal system - how can we function in accordance with it - case law*
- *resource specialists should wear one hat, but have skills to be effective members of a team*

TYPES OF SKILLS
- *we still need traditional professional skills and roles*
- *need people who can take a grand view of what's happening, on a large scale, in a an ecosystem*
- *applied scientists*
- *applied ecology*
- *land management agencies/employees need to be generalists vice specialists*
- *general knowledge of resources*
- *ability to use GIS*
- *functionalist vs specialist*
- *more generalists and maintain the technical skills*
- *chemistry*
- *marketing specialist*
- *Environmental Design Spec.*
- *pending legislation influences our professional skill needs*
- *background in field biology - field experience*
- *historical knowledge of the work place and local communities*
- *automation/GIS/orientation*

ORGANIZATION
- *long on organization and short on field staff*
- *apprentice program - specialist to specialist; specialist to generalist*
- *problem - single scarce skill in state assigned to SO, then not available to field - maintain continuity of experience*
- *same problem often with staff assigned to District*
- *contract out some specialized needs*
- *resource specialists should wear one hat, but have skills to be effective members of a team*
- *middle management job won't go away - be careful when flattening the organization*
- *use apprenticeships to bring on replacements for scarce skills before there is a void*

9 - TRAINING - INTERNAL

CONTINUING EDUCATION/CROSS TRAINING NEEDS FOR EXISTING STAFF

- *conflict resolution*
- *facilitator*
- *communication*
- *team dynamics*
- *strategic planning - team leaders, teams, managers*
- *ecology*
- *applied economics*
- *landscape ecology*
- *cumulative impacts*
- *biodiversity*
- *contaminants*
- *safety*

BUREAU OF LAND MANAGEMENT
SKILLS MIX STUDY

APPENDIX C

PERSONS CONTACTED

STATE GOVERNMENT

Wyoming Game & Fish Department, Green River District, Mark Fowden, Supervisory Fisheries Biologist
Wyoming Game & Fish Department, Jackson District, Tom Thoman, District Supervisor
Wyoming Game and Fish Department, Reg Rothwell and Gary Butler
State Historic Preservation Officer, John Keck
Wyoming Game and Fish Department, Casper District Office, Terry Cleveland, Larry Pate, Beau Peterson, Travis Cundy, Allen Conder
Wyoming Department of State Lands and State Forester, Paul Cleary & Mike Gagen
Wyoming State Geologic Survey, Gary Glass, Director
Transportation, Harry Underwood & Archeologist, Biologist, Agricultural Engineer
Wyoming State Parks and Historic Sites, Gary Thorsen, Director
Governor's Planning Office, Rod Miller
Department of Environmental Quality, Abandoned Mine Lands Program, Stan Barnard, Manager
Department of Environmental Quality, Land Quality, Rick Chancelor
Department of Environmental Quality, Water, group of four

FEDERAL AGENCIES

Agricultural Research Service, High Plains Experiment Station, Dr. Gerald Schuman, Director
Agricultural Research Service, Weed Science Lab, Norman Rees, Research Entomologist
Agricultural Research Service, Rangeland Insect Lab, Bill Kemp, Research Lab Director
Medicine Bow National Forest, Don Heiser, District Ranger
Shoshone National Forest, Bernie Spanogle, Resources Chief
Bighorn National Forest, Larry Keone, Forest Supervisor, Stephanie Phillips, District Ranger, Ron Stellingwerf, Ecosystem Assessment Coordinator
Wasatch National Forest, Tracy Abelsen, Wildlife Biologist
Ashley National Forest, Darlene Johnson, Hydrologist
Forest Service, Robert G. Bailey, PhD, Geographer
Forest Service Regional Office, Denver, Larry Mullen, Wildlife Program Manager, Miles Hemstrom, Inventory Group Leader
Soil Conservation Service, Everet Bainter, Richard C. Rintamaki
Environmental Protection Agency, Regional Watershed Coordinator, Karen Hamilton

FEDERAL AGENCIES *(continued)*

Fish and Wildlife Service, Chuck Davis, Jane Wayball, Steve Brockman, Pete Ramerez, Kim (field staff)
Fish and Wildlife Service, National Elk Refuge, Rocks Rogers, Biologist
National Biological Survey, Air Quality Monitoring, Al Riebau, Research Scientist
National Biological Survey, Natural Resources Ecology Lab, Tom Stohlgren, PhD
Geological Survey, Water Division, Barney Lewis & Randy See, Hydrologists
Geological Survey, Division of Petroleum Geology, Tom Albrandt, PhD, Director
Bureau of Mines, Intermountain Field Center, Galen Knutsen, Dale Teeters, Robert Reisenger, Dave Ferderer (Director & Staff)
Office of Surface Mining, Reclamation & Enforcement, Ranver Singh, Mel Granberg, Steve Anger, Greg Reed, Douglas Figgs (Manager and staff scientists)
Bureau of Reclamation, John Lawson, Project Director
Yellowstone National Park, Center for Resources, John Varley, Director
Grand Teton National Park, Rick Wallen, Wildlife Biologist
BLM, Worland DO, 40 Resource Management Professionals
BLM, Buffalo RA, Dave Pomerinke, Manager, Richard Zander & Neil Schiche
BLM WYSO, L&RR, Biological Resources, El Spencer, Chief
BLM WYSO, L&RR, Biological Resources, Marty Griffith, Dave Roberts, Rick Schuler, Gerry Federer (staff specialists)
BLM Colorado State Office, L&RR, Gary McVicker, Program Manager
BLM Montana State Office, L&RR, Minerals, John Moorhouse, Tom Lahni, etc.

UNIVERSITIES

University of Wyoming

College of Law, Deb Donahue, Professor of Law
Agricultural Extension and Economics, Bob Fletcher, Professor, & 2 grad students
Agriculture Department, Range Science, Bill Laycock, Professor
Zoology Department, Evelyn Merrill, Professor
Botany Department, Ecology, Bill Reiners, Professor
Botany Department, Rocky Mountain Herbarium, Ron Hartman, Curator & Professor

Montana State University

Department of Botany, Bruce Maxwell, Professor of Plant Ecology
Museum of the Rockies, Pat Leggi, Paleontologist

UNIVERSITIES *(continued)*

Colorado State University

Natural Resources, Rangeland Ecosystem Science, Tom Bartlett & Larry Rittenhouse, Professors
Department of Sociology, David Freeman, Professor and Chair
Natural Resources, Botany, Don Hazlett, Assistant Professor & Research Botanist
Natural Resources, Natural Resource Information Systems, Dennis Dean, Professor
Natural Resources Ecology Lab, Ted Elliot, Professor & Research Ecologist
Natural Resources Ecology Lab, Dave Swift, Professor Rangeland Ecosystem Science

Other Interested Parties

Park County Planner, Mark Sawyer
Natrona County Parks, Sam Weaver, Parks Director & Kelly Estes, Recreation Planner
Rocky Mountain Oil & Gas Association, Claire Mosley

BUREAU OF LAND MANAGEMENT
SKILLS MIX STUDY

APPENDIX D

DISCUSSION SUMMARIES

The following are Study Team Members' unedited discussion summaries. These summaries are based solely upon verbal responses and comments of the persons contacted for the Skills Study (APPENDIX C). The summaries represent the Study Team Members' perception and interpretation of those responses and comments. Any inaccurate reporting or misinterpretation of responses or comments is unintentional.

Interview Date & Time: *1/26/94*

Location: *Green River*

Name: *Mark Fowden*

Title: *Supervisory Fisheries Biologist*

Organization: *Wyoming Game & Fish Dept., Green River District*
(307) 875-3223

Background: *Fisheries*

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Everybody - We need all skills
We must concentrate on proper use of resources
Where are we going to decide to manage? Conservation vs. development?
Manage for landscape that meets ecosystem needs.
We need to have species richness.
Skills lacking - Those of naturalist skills we need people that are well rounded and understand the entire system and can envision the end product.
George Baxter's, Aldo Leopolds...
Communication skills
Someone who can develop sane and rational output - Ecosystem Manager
Use watersheds as subunits of ecosystem if we maintain resource areas.
Vegetation managers are key - Vegetation must drive system

Interview Date & Time:

Location:

Name: *Tom Thoman*

Title: *District Supervisor*

Organization: *Wyoming Game & Fish*
Jackson District
(307) 733-2321

Background: *Wildlife*

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Dedicated monitoring/Inventory staff
Feedback to planning
Ecologists (System & Plant)
Interdisciplinary

Skills Mix Interview

Wyoming Game & Fish Department

Reg Rothwell and Gary Butler together:

Landscape Ecologist position seems essential on the planning staff as a minimum, needed on each RMP effort. At least one specialist with formal education at the State Office or maybe in each District. General training for all.

Training through the ranks and to all affected interests including the general public in management for sustainability.

Enough staffing to deal with brushfires so that individuals are not pulled from normal duties to the point where proactive resource work is not getting done. This does not mean extra staff positions just for brushfires, but enough staff to cover brushfires and continue necessary inventory, monitoring, project work, etc.

To go with the last - Outside interests who initiate projects should be required to do the EIS/EA with their staffs or through a contractor.

Basic inventories for many resources still need to be completed. Staff needed for that and then a reasonable level of monitoring.

A well defined MISSION (read Desired Future Condition) for the Department, Agency, Resource Area, ecotype, allows proactive work to proceed.

Facilitators
Team Builders
Landscape Ecologists

All working and coordinating with other agencies or groups.

Biodiversity Workshops are extremely worthwhile especially when user groups, legislators, the public, and our own people are all in the class. Have more of them. Try role switching within the workshops, i.e. an oil&gas representative be a wildlife advocate in an exercise.

More training in biodiversity and ecology concepts for BLM people.

More Cumulative Impacts training. Within BLM we need more skills and tools to do cumulative impact analysis.

Interdisciplinary Teams - interagency teams - multi-interest teams working on planning efforts. Occasional cross assignments between agencies. Some "excess" positions might be covered through inter-agency agreements, i.e. Forestry by a Wyoming coordinator in Forest Service or State Lands.

Through outreach programs, educate the public and our constituents in Adaptive Management (multiresource, sustainability, biodiversity); this is a continuous, ongoing process.

Keep the public and our own people up to date on new techniques.

Managerial/Supervisor training - so that they know how to make sound decisions. Keep them modern and up to date on missions, goals and technology. Demand that managers stay up to date in their outlook/perspective - continually get rid of old foggies.

Team participation is the best teacher for ecosystem concepts - you learn to understand the concerns and interests of the other specialists or interest groups on the team. It broadens horizons. Interagency Teams.
Department of Transportation - Harry Underwood and Archeologist, Biologist and

Agricultural Engineer

Geomorphologist - to study and interpret land form changes.

Historians

Skills to work with Native American groups.

Technical skills are there now.

Ecologists - office positions - to interpret results of field investigations - these should be generalists without vested interest in any one aspect of resource management.

Conflict Resolution training - especially for managers - could possibly be a specialist, but must have no vested interests.

Public participation specialist.

Continuing education for technicians and cross-training.

Strategic Planning training for all planning team members.

Transportation Route Planning - State/County plans as well as recreation and access needs should be included in planning efforts.

Working knowledge of ecosystems is more important than complete inventories of all resources so that what data is available can be used most effectively.

Must maintain career paths for technical specialists if we want to continue to attract the best people to BLM.

Timeliness of processing permits must be maintained.

January 12,1994 2:00pm
Barrett Bldg.
John Keck
State Historic Preservation Officer
State of Wyoming, Department of Commerce

Mr. Keck has worked in State government for many years and has served in his current position as SHPO since 1991. Mr Keck has an academic background in recreation and has been involved in several projects with the BLM and USFS.

The following is a listing of knowledge and professional skills he felt were important to enhance as the BLM moves forward into Ecosystem Management. Mr. Keck's greatest concern revolved around the importance of internal interdisciplinary cooperation and communication with the various BLM offices and those interagency relations that should exist to make the ecosystem management transition go smoothly.

1. *become cross-trained so as to not be myopic*
2. *visualize the BOG picture*
3. *positive attitudes and the ability to maintain a positive attitude*
4. *conceptualizing*
5. *problem solving with an open mind*
6. *ability to encourage failure with out excessive risk*
7. *implementation detail oriented*
8. *organizational*
9. *management with encouragement for experimentation*
10. *leadership for both small and large groups*
11. *cheerleading to get the public to buy into the plan*
12. *revisit failures to understand why without condemnation*
13. *consensus building*
14. *analytical for the degree of difficulty for a given problem*
15. *idea generating skills*
16. *facilitation*

SKILLS MIX STUDY

AGENCY/ORGANIZATION: *WYOMING GAME AND FISH DEPARTMENT, DISTRICT 7, CASPER DISTRICT OFFICE*

DATE/TIME: *January 21, 1994 3:00 P.M.*

PERSONS INTERVIEWED: *Terry Cleveland, Larry Pate, Beau Peterson, Travis Cundy, Allen Conder*

INTERVIEWERS: *Bill Mortimer, Jon Johnson*

QUESTIONS:

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

BLM needs to have the wildlife "covered".

BLM needs to streamline our regulatory process.

Many BLM specialists lack an awareness of what the "other guy" thinks. They need to coordinate better with each other and with others.

BLM needs to "go slow" with ecosystem management - first "set some common ground" before we proceed.

BLM specialists need "cross training" to learn about other resource management activities.

<u>All</u> specialists need to be involved in ecosystem boundary delineation.

BLM needs a system to "weed out non-people people".

Comments: The selection process for personnel is key.

BLM needs to hire people who have an "overall general knowledge of resources".

Comments: BLM (employees/specialists) are too specialized - too narrowly focused (in their own program/area of expertise). BLM specialists lack a good general knowledge of other resource activities.

BLM has too many "special interest specialists".

BLM needs to put many of our specialists in short courses to learn about other resource activities - to find out what other specialists do in the out fit. They <u>need</u> to know.

BLM needs more budgetary flexibility. BLM needs "pot of money" funding.

Comments: Budgets drive BLM's programs - not resource management needs.

BLM budgets are micro-managed.

BLM often does not have money to readily fund cooperative projects with G&F.

BLM needs adequate funding to conduct inventories.

Comment: Inventory is a <u>basic need</u> for management.

BLM needs to streamline its rules and regulations.

Comment: BLM has too many rules and regulations (that frustrate effective and efficient management - and G&F).

BLM needs a "good definition of ecosystem before we start so everybody knows what we're talking about."

Comments: All agencies need to get together and develop common criteria/definitions (for ecosystem/ecosystem management).

All of BLM's people/employees need to get together and agree upon common criteria/definitions.

"What will come of all this (ESM initiative)? What will happen while this (ESM) is being implemented?

BLM needs some "success examples" (of management activities/projects.

Comments: BLM "does a lot of planning and little doing".

BLM needs to "get everyone in on equal footing" (in the ESM Initiative).

Comments: All interests have to be on the same playing field.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

BLM needs more "generalists" (instead of more specialists).

BLM needs to get people with good "people skills" and needs better "communicators" throughout the organization.

BLM needs more people and (people with good) communicator skills.

Comments: Many people in natural resource management tend to be "anti-social" and not good communicators. (Agencies such as BLM and G&F should) get people with good people skills and teach them wildlife and natural resource (management) skills.

January 13, 1994 2:00pm
Hershler Bldg
Paul Cleary and Mike Gagen
Wyoming Department of State Lands and State Forester

Mr. Cleary has been employed by the State of Wyoming in various capacities from the State Planning Office to his current position as Associate Director of State Lands. Mike Gagen is currently the State Forester and has worked for the State Department of Forestry for several years. The State Forestry Department is administered under the Department of Lands.

The following is a listing of knowledge and professional skills they felt were important to enhance the BLM's move into Ecosystem Management. Both individuals interviewed agreed upon two concepts needed to be successful in implementing ecosystem management in the Bureau. First, to decide what business we are really into before we begin to improve it (ie. define ecosystem management and how it compares to the status quo). Secondly, the ability to convince the public that the change in direction will be for everyone's benefit over the long term.

1. *hand holding*
2. *technical writing (simplified yet concise)*
3. *photographic documentation*
4. *decision making skills (NIM... not in my...*
5. *legal skills interpreting case law and regulations*
6. *ability how to explain how?!!!*
7. *work with the media to provide accurate and useful information*
8. *how to develop a working relationship with the media*
9. *skills needed to work with a committee or board.*
10. *how to get every one on the inside of the tent so we are all p*ssing out instead of into the tent*

February 17, 1994
Wyoming State Geologic Survey Building
Gary Glass Director
Wyoming State Geologic Survey

Mr. Glass has been director of the State Geologic Survey for 13 years. He also serves on the Wyoming Oil and Gas Commission. Mr. Glass and his staff have been directly involved in the review of BLM planning and environmental documents for over 10 years. They routinely respond to BLM with comments and recommendations on technical concerns during the review process.

Overall, Mr. Glass feels the BLM has suffered from a lack of expertise in economic geology. Generally, the Bureau is not able to accurately depict market trends and estimate overall market conditions for a given mineral commodity. Often times we grossly over or under estimate current market conditions and trends for gemstones, other solid minerals, oil, and gas. Most often we are guilty of not responding to the Survey's comments on various documents. Mr. Glass believes our cooperative efforts could be improved. He mentioned that BLM could do a better job networking to encourage early involvement from the public and other agencies in the planning and decision-making process.

The following is a listing of knowledge and professional skills he felt were important to enhance as the BLM moves into Ecosystem Management. Mr. Glass emphasized the importance of having access to specific skills when developing the BLM planning documents. He encourages BLM to look beyond traditional boundaries and expand upon the partnering approach necessary in ecosystem management. He also stresses the importance of separating the technical review and coordination meetings from traditional public meetings.

1. *coal, oil and gas, construction variety, and hard rock geologists*
2. *specific economists (recreation, social, minerals, agricultural)*
3. *team players*
4. *public sales*
5. *mineral appraisers*
6. *consensus building*
7. *mineral development forecasting*
8. *mining engineers*
9. *geologists and engineers with specific industry expertise*
10. *planning skills*
11. *market analysis*
12. *writing for the public with facts*
13. *communication skills (internal, external, informal...)*
14. *networking skills*

Department of Transportation - Harry Underwood and Archeologist, Biologist and Agricultural Engineer

Geomorphologist - to study and interpret land form changes.

Historians

Skills to work with Native American groups.

Technical skills are there now.

Ecologists - office positions - to interpret results of field investigations - these should be generalists without vested interest in any one aspect of resource management.

Conflict Resolution training - especially for managers - could possibly be a specialist, but must have no vested interests.

Public participation specialist.

Continuing education for technicians and cross-training.

Strategic Planning training for all planning team members.

Transportation Route Planning - State/County plans as well as recreation and access needs should be included in planning efforts.

Working knowledge of ecosystems is more important than complete inventories of all resources so that what data is available can be used most effectively.

Must maintain career paths for technical specialists if we want to continue to attract the best people to BLM.

Timeliness of processing permits must be maintained.

January 17, 1994
Barrett Building
Gary Thorsen, Director
Wyoming State Parks and Historic Sites

Mr. Thorsen has been director of the State Parks and Historic Sites for 5 years. Prior to that he worked as a section chief and staff person for the State Parks organization, the National Park Service, and the US Forest Service. Mr. Thorsen has been directly involved in the development of the new fee program for State Parks and has worked closely with public groups seeking involvement in the fee program as well as many other politically sensitive recreation-related functions.

The following is a listing of knowledge and professional skills he felt were important to enhance as the BLM moves into Ecosystem Management. Mr. Thorsen emphasized the importance of dissipating the "Big Brother" mentality and public perception before the Bureau can make progress on the partnering approach necessary in ecosystem management.

1. *landscape architecture*
2. *recreation sociology*
3. *team players*
4. *public sales*
5. *team building*
6. *consensus building*
7. *coffee shop talk (good-ole-boy skills)*
8. *personal salesmanship*
9. *marketing*
10. *planning*
11. *market analysis*
12. *writing for the public with facts*
13. *communication skills (internal, external, informal...*

Contact Gene Decker of CSU for "grass roots" techniques 303/492-5656.

INTERVIEW DATE & TIME: Jan. 19, 1994 1pm
LOCATION: Herschler Bldg. 4th floor, Rod's office
NAME: Rod Miller
TITLE:
ORGANIZATION: Governor's Planning
BACKGROUND:

WHAT KNOWLEDGE OR ABILITIES DO WE NEED FOR BLM TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Communication very good between BLM and the State and needs to remain so.

He feels we already have the people with the skills needed for ecosystem management.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LAND AND RESOURCES ADMINISTERED BY BLM?

We need to keep the skills we presently have.

People skills training for public outreach for local level personnel.

Liberal arts people to look holistically.

Contract for facilitators if need be.

If we use UW to do training, public outreach type, we should coordinate with the Forest Service and State agencies. He feels they also need this kind of training, perhaps worse than we do!!!!

INTERVIEW DATE & TIME: 19 Jan. 1994 11am
LOCATION: Vickie Daniels' office
NAME: Stan Barnard
TITLE: Manager
ORGANIZATION: DEQ Abandoned Mine Lands program
BACKGROUND: He has worked in the field before this job and has dealt and still does deal with the local level personnel.

WHAT KNOWLEDGE OR ABILITITES DO WE NEED FOR BLM TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Public relations - we should have the ability to work with the users and our neighbors.

Mineral aspects.

Organize data bases in one spot.

Make decisions sthat meet goals even though everyone is not in agreement with the decision(s).

Make sure mission and goals are known to both the employees and the public.

Make sure employees are aware of their responsibilities and the law.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LAND AND RESOURCES ADMINISTERED BY BLM?

Know where lands are that BLM manages at the local level. Be able to do site visits to every part that is accessible.

Public relations - ability to work with users and our neighbors.

Wildlife skills are critical. Use a coop agreement with USFWS, WY. G&F to utilize their expertise where needed.

Vegetation -livestock use vs. wildlife.
-plant expertise to know best species for needs and use of the lands.

Soils

Geological, esp. mineral management.

Engineering, esp. civil, geotechnical.

Financial accounting of the lands. Management technics and budget.

Cultural

Ecologist skills at the local level.

First line decision making here at the local level. Most info on the land is known at this level.

Data management/computer skills.

Public relations skills are very important. Public has more interest/curiosity in what the government does now and we should be prepared to inform and answer to them.

INTERVIEW DATE & TIME: 18 Jan 1994, 10 am
LOCATION: Herschler Bldg, Cheyenne, Wy.
NAME: Rick Chancelor
TITLE:
ORGANIZATION: DEQ, Land Quality
BACKGROUND:

WHAT KNOWLEDGE OR ABILITIES DO WE NEED FOR BLM TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

COMMUNICATION skill most critical at this level, esp. with other agencies.

Communication ability between specialties , ie. veg people in BLM with veg people of other agencies, ie. environmental, Stockgrowers.

More involvement with outside groups will help eleviate fears of BLM managing private lands.

Internal communication between specialties within BLM; ie wildlife and minerals, is important and necessary.

Resolve ecosystem boundaries; how will we work with FS who defines theirs differently. Edge effect will be the biggest problem.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LAND AND RESOURCES ADMINISTERED BY BLM?

wildlife-bugs probably not needed below the State level. Fish more at the District unless there are fisheries in the resource areas (State office may be appropriate level). 4-footers at local level because of their numbers.

archaeology- these people may be more important in certain parts of the state than others at a local level.

minerals-involve these people heavily.

range and shrubs.
inventory for plants at the local level, then after inventory the District level would be the appropriate place for the specialist.

Ecology coordinator or systems person at District level to orchestrate and know where the ecosystems are at.

Talk with the Yellowstone ecosystem people about their coordination with others. What to avoid and what was good.

Soils:
work with SCS. Can we rely on their information or do we need our own person below the state level? Have they inventoried the State? Are we talking/coordinating with these people? We don't need a soils person at the local level probably.

Forestry:
work with FS. Give forested lands to FS and get the grasslands out of the FS.

Database management people to keep systems useable, manage data from specialities. Databases need to be useable by specialists.

Data entry clerks who work closely with specialists. Both should enter data, specialist should screen.

Recreation specialists at all levels.

Air Quality at state level and provide close coordination with DEQ air people.

Presently in our system, local level cultural expertise lacking. There's a bottleneck. Company has to hire 3rd party to get cultural done.

Wetlands

COE handles. No inventory though. Delineation of wetlands on public lands? Do we need to do this? Soils, veg, hydrology people involved.

Economist at the State level.

Department of Environmental Quality - Water four people

Hydrologists in each field office - to address the wide scope of impacts that are due to modifications to streams.

Stream morphology background.

Knowledge to put things back into proper functioning condition.

Political boundaries must be crossed.

Ecologists to assimilate the data who can include human factors.
geomorphologists
bioassessment -- ecologists must be able to identify the state/condition/phase of the land people must know the potential of the land.

Hydrologists; Entomologists; Botanists; Fisheries Cross training important between disciplines.
Short courses in basics of hydrology, range, botany, fish, etc. - just the basics for cross training specialists.

Update technological knowledge for the professionals as well as cross training for others.

Communications skills - don't keep secrets - work cooperatively

State/Federal conflicts - education is the key

Internal coordination within agencies

Directories and Organizational charts as a public outreach.

Digital Information transfer and exchange - data sharing - GIS

Data base design skills to be responsive to future uses and sharing of data.

Data/GIS coordinator (internal or external) to assure shareability of data.

Compliance with Federal and State laws/regulations. Natural Resources Manager/Environmental Policy Specialist/ Environmental lawyer/Regulatory Compliance Specialist

work to assure consistency among federal agencies as in "Good" meaning the same for all agencies.

Facilitation skills to know and understand the differences above.

January 17, 1994 2:00pm.
High Plains Experiment Station
Dr. Gerald Schuman, Director
Agricultural Research Service, High Plains Experiment Station

Dr. Schuman has been involved in the ARS over the country in a variety of capacities. He has been in his current position for 18 years. Dr. Schuman has an academic background in soils and soil chemistry. He has been extensively involved in disturbed land reclamation research during his career. He has taught in several BLM courses through the Phoenix Training Center as well as been involved in numerous symposia and conferences involving soil and plant relationships worldwide.

The following is a listing of knowledge and professional skills he felt were important to enhance as the BLM moves into Ecosystem Management. Initially Dr. Schuman mentioned that generally we will need all the type of skills and knowledge we currently utilize. However, he felt that there are several new or under used skills that must be added to our current base.

1. *general ecological knowledge in persons trained as facilitators*
2. *systems ecology*
3. *soils ecology*
3. *soil biology*
4. *soil chemistry*
5. *soil physics*
6. *nutrient cycling*
7. *micro-biology*
8. *all biological specialists*
9. *team players*
10. *integrators*
11. *facilitation*
12. *plant ecology*
13. *animal ecology*
14. *realism, recognition of what is technologically feasible*

Interview Date & Time: 1/18/94
Location: Bozeman, MT
Name: Norman Rees
Title: Research Entomologist
Organization: ARS - Weed Science Lab
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- understand edges (limits) of ecosystem or habitat for organisms that we deal with
- does environ. favor growth and reproduction - favor natural enemies
- understand effects of disturbances (cattle, hailstorm, etc) on natural functions
- ex. insects that concentrates on eating area due to plant odor
- indicator plant understanding - historic climax - human interaction/influence
- understanding of interrelationships
- diagnose problems - indicators of getting what we want out of land
- get knowledgeable specialist out to educate BLMers and also landowners - technology transfer
- technology transfer, and data management.
- concept of what is socially acceptable. The skills needed - sociology etc.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- paleobotany, biohistory
- plant ecology
-

Other comments

- shadow highly skilled (indispensable) specialists with promising individuals - apprenticeships - 'avoid voids'
- train your replacement
- talk to people often to maintain communication
- place skills as close to ground as possible or if not - have someone on ground who is trained at least to do that part
- if spread too thin - can't get work done
- keep man in mind in managing ecosystem
- you don't destroy balance of nature - just change it
- with weed control - be aware of what will come in when you remove something from ecosystem
- How do we use key personnel that we have at present - Buck Waters, Hank McNeel are examples.
- Talked some about the Stillwater Project. Interesting Ideas for the development of professional skills.

Interview Date & Time: 1/19/94
Location: Bozeman, MT
Name: Jerry Onsager, Bill Kemp
Title: Researcher, Lab Director
Organization: ARS - Rangeland Insect Lab
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- *need to understand how insects function under varying conditions*
  - *seasonal, drought years, etc.*
- *need hypothesis - the right questions - to know what data to collect*
- *technology transfer - data management*

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- *BLM needs entomology expertise*

Other comments

- *insects will get their share of vegetation first*
- *APHIS not geared toward integrated management*
- *grasshoppers consume 25% of available forage - but not all bad - accelerate litter creation*
- *we need to figure this into forage allocation*
- *this particular lab is funded heavily by APHIS in past - tapering off - not much funding base from ARS - looking for cooperative work but need $*
- *looking at grazing strategies that discourage grasshoppers*
- *information gathered under wrong circumstances may be worthless*
- *we need to be taping into ARS*
- *their emphasis is on high quality research but need to get more involved in service aspect - provide on the ground assistance*
- *example of how grazing strategies - rotation - not allowing favorable conditions every year for certain species (grasshoppers) development - instead of season-long grazing*
- *needs more cooperators for lab - esp. interested in grazing/insect relationships*
- *shorter loop between research and application - more direct communication*
- *lab works directly with APHIS PPQ OICs like John Larsen*
- *range cons can handle at ground level with sister agency support*
  - *better communication*
- *noted that Buck Waters is only one in agency with his ecosystem - spread too thin*

SKILLS MIX STUDY

AGENCY/ORGANIZATION: *USFS, MEDICINE BOW NF, DOUGLAS DISTRICT*

DATE/TIME: *Monday, 1/24/93, 10:30 AM*

PERSON INTERVIEWED: *Don Heiser, District Ranger*

INTERVIEWERS: *Bill Mortimer, Jon Johnson*

QUESTIONS:

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Need to get the private landowners on board as soon as possible, early in the (ecosystem management) process. Don spent a lot of time talking about ways to approach the private landowners.

Need some abilities to explain some proper management and reasons for proper management to intermingled land owners

Don sees the "Feds vs. private lands issue" as the "bottom line".

Comments: Due to large public land acreages in Wyoming, Federal agencies plans and policies do significantly affect use of private lands.

Federal agencies need to involve as many private interests as possible in this issue (ecosystem management).

Comment: Private land owners are afraid more restrictions will be imposed on them as a result of the Ecosystem Management Initiative.

Federal agencies need to be selective in who we choose to work with on the ecosystem management initiative - pick the "folks we can work with." These often may be "second generation" individuals who may be more amenable to "ecosystem management objectives."

There are several things to consider with respect to public involvement (in ecosystem management):

Timing for public input is an important consideration.

We need to meet with select users/groups individually.

"One-on-one" contact is better.

Include the "extremists".

Go to environmental groups' meetings to explain policies and initiatives.

Meet groups and users on their "turf" to open up meaningful dialog.

BLM needs to "get private land owners on board (with ecosystem management)" with an inventory (of resources on private as well as Federal lands), telling them we are "trying to look at the whole thing".

There needs to be more open communications and coordination between FS and BLM specialists.

Agencies need to "stand together" on mutual issues/initiatives to demonstrate

"consensus and unity of purpose".

Agencies need to talk to select landowners and individuals from the "Core Group" (Private landowners, G & F, FS, and BLM).

FS needs a good inventory of species on the Thunder Basin National Grassland.

(Agency budget managers) need to recognize and adequately fund mandatory activities on FS and BLM lands.

Comment: Many of the mandatory activities BLM and FS conducts are barriers to what we want and need to do leaving little funding for things we would like to do (ecosystem management, etc.).

Many initiatives are "funded off the top" now, using money from other activities. This hurts other programs.

Managers need more funding flexibility for Oil and Gas program management and for other programs.

BLM and FS need more flexibility to spend money for needed projects and actions.

Comments: Delays in getting <u>final</u> budgets delays needed actions and projects.

Straightening out the budget process would probably fix 50% of our problems.

BLM folks need to understand FS programs, and vice versa.

BLM and FS need to deal openly and honestly with their publics.

BLM and FS need to make our planning, environmental, and other documents readable - in layman's language so people understand them.

Comment: (The District Ranger complemented BLM for making the Newcastle RMP a "readable" document.)

Everyone needs to "get on the same page" with respect to the Ecosystem Management Initiative.

BLM and FS need to follow through with promised actions (to gain credibility with the public).

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

Don thought that all staff needed more communication skills, people skills - be able to "spit and whittle".

Indicated that "barriers" such as budget and personnel ceilings would prevent us from having all the professional skills we would need. Opportunity now is to share the scarce skills that each other have.

Don sees a need to expand the area of influence of our decisions. Therefore, a much closer coordinated effort between the two agencies needs to be pursued

Botanical skills are the most critical and needed (for sensitive species identification/inventories).

Agencies need a simple way to share skills/people.

Comment: A common funding system would allow agencies to better cooperate with each other - sharing of personnel, contributed funds, etc.

Don was really concerned about having enough wildlife skills to complete needed inventories.

BLM needs skills to bring people together and needs some kind of "structure" to get this done.

The FS needs more wildlife biologists on the MBNF and TBNG.

BLM needs people to inventory sensitive species.

Comments: T & E skills are "not a big deal" (as there are a lot of people with T & E skills in Federal agencies).

Interview Date & Time: 1/13/94
Location: Cody
Name: Bernie Spanogle
Title: Resources Chief
Organization: Shoshone National Forest SO
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- it is very important to have a common resource data base. All agencies need to be working with the same information (same system USFS 615 system)
- common issue identification
- be specialists, not just functionalists
- communication is very important. We need to have people that are in charge of coordination.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- ecologist - various kinds
- fire ecologist
- botany - sensitive species, plant ecology
- smoke management - FS has this
- resource specialist should wear one hat, but have the skills to be effective members of a team.

Other comments

- A great deal of time was spent talking about the reorganization that has been done on the Shoshone.
- Organizational Task Force - been working in SNF for past couple of years
- SNF has a vision statement
- separate strategic and implementation levels
- ESM means better coordination
- change in priorities - who we do business with, when we do it, etc.
- some success with GYS Vision - griz bears, fire management - took lots and lots of communication
- tear down barriers - share skills - eg. fire
- SNF going back to specialists in stead of generalists
- middle management job won't go away - who's going to do it? - be careful - person on the ground ends up doing middle management 'paperwork' - don't go too far too fast
- new forest structure - ID team - physical, social, economic specs
- core team - automation, data, telecomm, etc.
- ID teams will need traditional mix of resource specialist, but will also need social science skills.
- ideas - are we willing to share office in Meeteetse with FS, WGFD, etc.?
- provided lots of handouts, notes, etc.

Interview Date & Time: 1/12/94
Location: Sheridan
Name: Larry Keown, Stephanie Phillips, Ron Stellingwerf
Title: Forest Supervisor, District Ranger, Ecosystem Assessment Coordinator
Organization: Big Horn National Forest Supervisors Office
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- Data management
  - DG on its way out - project 615 is new system
  - FS has tremendous riparian data - need to merge with ours
- Coordination of GIS skills. We need to make sure that information is standardized.
- there is an ecologist on forest - but- need to integrate forester, wildlife, soils input - need someone - NRS type/leader - public relation needs--> let people know what we're doing - we've let economics slip by too much - they have an economist in region - FS (BHNF) has a lot of engineering capability that we could tap bridges, road design, trails, etc
  - cooperation on road maintenance, etc.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM? - possibilities of sharing skills - void in human resources:

sociology, economics
landscape architect
recreation planners
soils
geology
native american coordinator
fisheries
ID team leadership

- Interagency coordination skills -- a position that would act as a liaison between agencies.

Other comments

- Talked about the traditional resource roles and the continuing need for these skills.
- There is a need for greater coordination efforts. This could be done very easily by managers. Kowen made the comment about all that,was need was for the District managers and himself to sit down and determine how to share the available skills.

They've identified 4 specific ecosystems in Big Horn NF - focus areas - may be defined on cultural boundaries (e.g. highway corridor) - opportunity for coordinated activity plans

- we've trained folks to have tunnel vision

- budgets preclude filling voids in skills - share between agencies

Interview Date & Time:

Location:

Name: *Tracy Abelsen*

Title: *Wildlife Biologist*

Organization: *Wasatch National Forest*
(307) 789-3194

Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

GIS skills.
Communication skills.

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Computers.
Herpetologist
Ornithologists - Contracting with Universities
- Conducting grid surveys

Interview Date & Time:

Location:

Name:	*Darlene Johnson*
Title:	*Hydrologist* *Supervisor's Office*
Organization:	*Ashley National Forest* *(801) 789-1181*
Background:	*Geography, botany*

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Joint planning by teams from all agencies.
Central GIS Data Base - all agencies contribute
Vegetative, landforms
Ecology, hydrology, wildlife, soils
Need common understanding of terminology - Everyone needs to be on same level of understanding.
Ecotype mapping
Basic ecological monitoring
Identify needs and opportunities between agencies.
Develop monitoring strategies.
Ecosystem based planning, not agency oriented.
Coordinated collection of data photoimagery, etc.

Interview Date & Time: 10am Friday, January 21, 1994
Location: Rm 219 USDA Building, I-25 & Colo 14, Ft Collins, CO
Name: Robert Bailey, PhD
Title: Geographer
Organization: USDA
Background: Dr. Bailey is the Forest Service's expert on delineation of ecoregions.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-You need individuals with the knowledge and abilities to capture and synthesize the information.

-Integrated skills

-Geography - the different specializations

-GIS/Remote Sensing. Doesn't believe in a technological fix to all of our problems.

-You need an understanding of the ecosystem and the interrelationships. There is an interaction between the systems.

-You may have varying needs for ecologists.

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-You need those skills to see how things fit together - the relationships.

-To identify linkages to larger systems - scales of analysis

-Looking at the relationship of ecosystems to man, how do you define the ecosystem?
-Capture in a meaningful way that reflects our understanding of management concerns for the ecosystem.

-Understanding of the different types of soil, vegetation, and fauna

-Different units evolve - understand what they are, how they work, and where they are located.

-Capture the relationships - the interactive relationships.

-The educational system compartmentalizes and develops specialty knowledge. We need macroscopic skills to encourage seeing the big picture.

-In a sense, development of macroscopic skills is evolutionary. There is a training progression. You start out and a discipline in a relatively small area, then progress to larger scales.

-You really need an apprentice type program (at the masters level) to work with a top hand

-I think there is too much emphasis on the technological (GIS) fix.

-You need good analysts, good thinkers.

-There is no absolute truth. We deal with dynamic systems such as climatic landform units or eco-climatic

units.

-Ecosystems are nested systems. The oceans control the climates.

-Ecoregions consist of different types of landforms or surfaces that redistribute and transform energies. You need to understand the processes involved from the macro to the meso to the micro through the application of inductive and deductive reasoning.

-What are the emergent properties of the systems? The whole is more than the sum of the parts. There are interactions. Components don't behave in isolation but in association. A meadow in a forest is different from the same type of system in the grasslands because of interactions with the habitat. Capture the linkages.

-Landscape ecology -sources: U of Michigan; Burton Barnes, Athens, Georgia

-Dr. Bailey doesn't believe in modeling or technological fixes. There is no way to extend the model. Some ecosystems behave in a chaotic manner.

-<u>The Intuitive Edge</u>, by Goldberg. Most scientific leaps are intuitive

-Legal and regulatory requirements force us to analyze things to death.

-There are process people and solutions or product people.

-The trick is to get the work done in spite of the system.

-We need creative, intuitive, generalists, team players.

-Take good scientists, those who have mastered their disciplines, then generalize them.

-There are three type of analysis:

1.	*What is the land capable of sustaining?*	*Sustainability*
2.	*Does it meet social criteria?*	*Suitability*
3.	*Is it economically feasible?*	*Feasibility*

-Ecological planning oversees the analytical process. It works within limitations and opportunities provided by the ecosystem - what is possible.

-You need the ability to bridge organizational hierarchies.

January 26,1994
USFS Denver
Larry Mullen and Miles Hemstrom
Wildlife Program Mgr. and Ecosystem Inventory Group Leader
USFS Regional Office

Background: Larry has worked for the USFS over 30 years, primarily in Region 2. His assignments have been associated with wildlife management. Both he and Miles are currently two of the key organizers of the ecosystem management activities in Region 2. They work closely with the professionals i the Regional Office and each of the Forests to implement ecosystem management at the local level. Miles Hemstrom has spent most of his 14 years with the USFS in the Pacific Northwest. He is an ecologist by training and has served as a Landscape Ecologist most of his tenure.

Both individuals believe that in order for ecosystem management to become successful, the agency must change the way we deal with processing typical multiple use activities.Ecosystem management forces us to change our perspectives on an individual project to a larger scale, one that requires us to look at the affects on the ecosystem we are managing. The USFS uses a three-tier filter system to help manage their approach to on-the-ground management decision making process. They call this process the Biological Diversity Assessment process. This process involves: a course filter (yields large scale ecosystems), a fine filter (yields the planning and management scale ecosystem), and an analysis of the Range of Natural Variability (a term that reflects the long term sustainability of an ecosystem).

The following is a list of their suggestions for skills or knowledge...

1. *Ecologists: landscape, plant, range, soil, T&E, aquatic, etc.*
2. *Automation specialists*
3. *GIS and data management skills*
4. *Social sciences (general)*
5. *Sociological (analytical)*
6. *Demographics (relationship of community to the land base)*
7. *economics*

Larry/Miles USFS cont.

8. *Public involvement*
9. *Environmental Education*
10 *Planning in general*
ii. *Recreation use and characterization*
12. *Collaborative decision making*
13. *Alternative dispute resolution processes*

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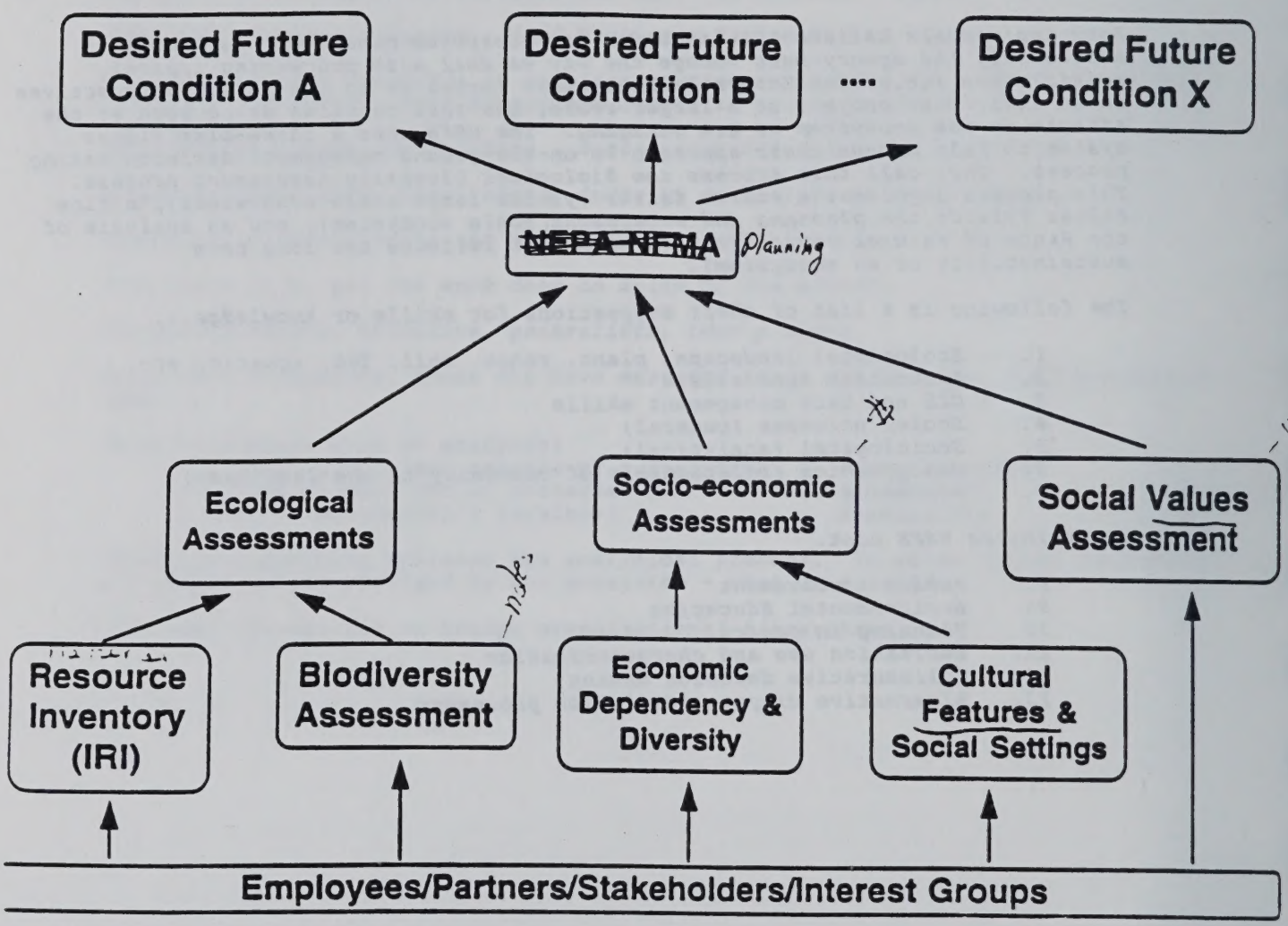
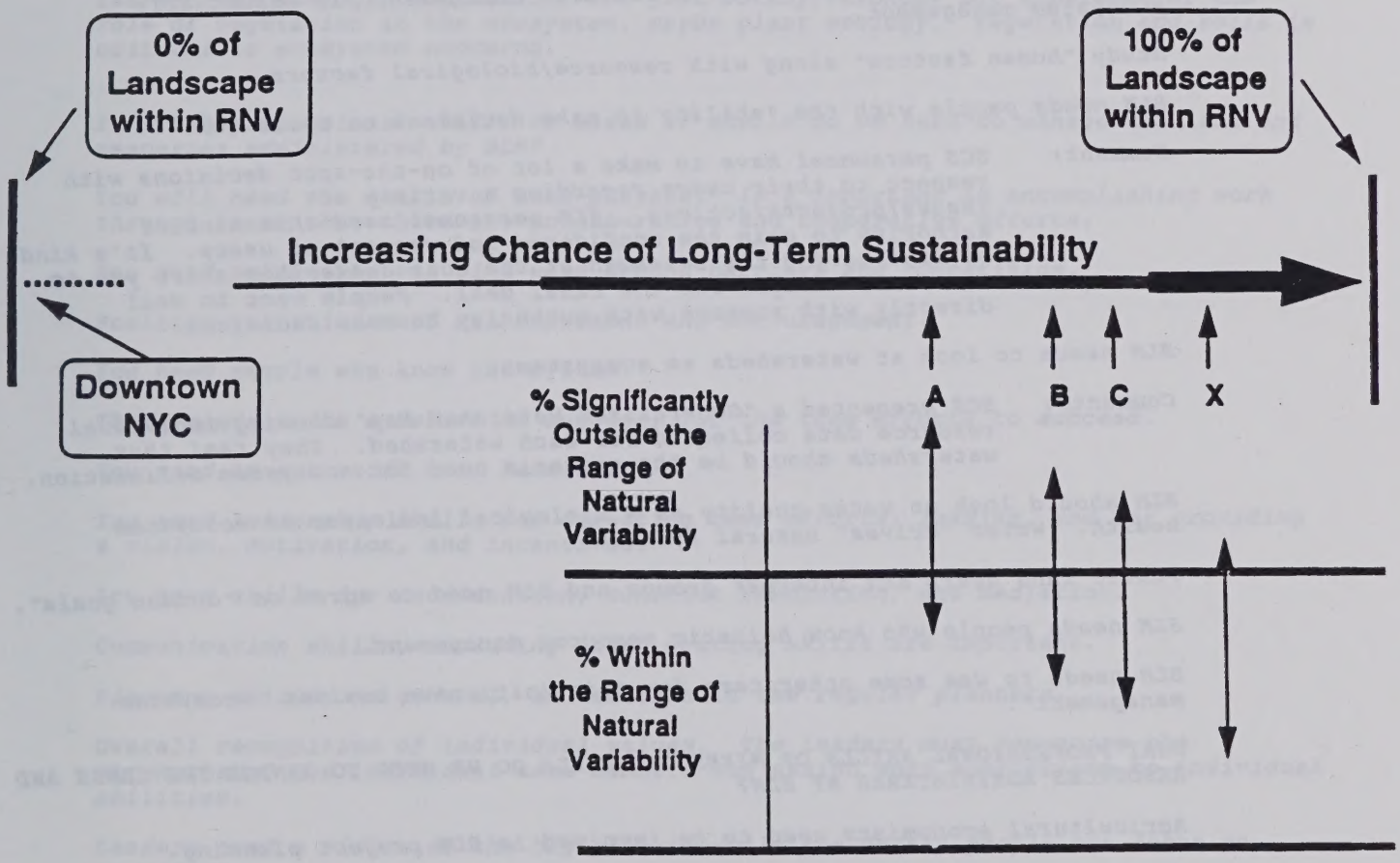
- FOREST MANAGEMENT PLANNING -

Ecosystem Management



Ecological Sustainability and the Range of Natural Variability



AGENCY/ORGANIZATION: *SOIL CONSERVATION SERVICE, CASPER*

DATE/TIME: *January 20, 1994*

PERSONS INTERVIEWED: *Everet Bainter and Richard C. Rintamaki*

INTERVIEWERS: *Bill Mortimer, Jon Johnson*

QUESTIONS:

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

SCS feels that their "coordinated resource management" is essentially ecosystem management.

Study "human factors" along with resource/biological factors.

BLM needs people with the "ability to make decisions on their own."

Comment: *SCS personnel have to make a lot of on-the-spot decisions with respect to their users regarding a variety of issues/projects/actions. BLM personnel need this kind of authority to gain the confidence and respect of users. It's kind of like having the salesman at the auto dealership shift you to the sales manager for the final deal. People want to deal directly with someone with authority to make decisions.*

BLM needs to look at watersheds as ecosystems.

Comments: *SCS presented a "Generalized Watershed Map" showing individual resource data collected for each watershed. They feel that watersheds should be the criteria used for ecosystem delineation.*

BLM should look at water quality as a biological indicator of ecosystem health. Water "drives" natural systems.

Public land users and interest groups and BLM need to agree on "common goals".

BLM needs people who know holistic resource management.

BLM needs to use some other term for this initiative besides "ecosystem management".

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

Agricultural economists need to be involved in BLM project planning.

Comment: *SCS has agricultural economic expertise they can share with BLM.*

BLM people need better people skills .

Comment: *This is the "ramp in the tank" for BLM to begin to improve its public image.*

A lot of BLM people get "burned out" by being put down by users.

BLM needs water quality specialists, invertebrate biologists, chemists, geomorphologists, watershed specialists, and trained facilitators.

BLM needs people with "group meeting" skills.

Interview Date & Time: 10am Tuesday, January 18, 1994
Location: telephone interview (Denver)
Name: Karen Hamilton
Title: Regional Watershed Coordinator
Organization: Environmental Protection Agency
Background: Zoology, fisheries, research

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

BLM has good expertise in the field already. You need knowledge of traditional concerns such as riparian coordination, water quality, soils, wildlife, wetlands, fisheries, hydrology, fluvial geomorphology, range ecology.

Additionally, there may be a need for knowledge of landscape ecology or terrestrial ecology, vegetation, not just botany/taxonomy but knowledge of the role of vegetation in the ecosystem, maybe plant ecology. Vegetation and soils is critical to ecosystem concerns.

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

You will need the skills of team players. It's important in accomplishing work through teams that there are collaborative and cooperative efforts.

You need people who can find ways around barriers and competition.

Positive qualities need reinforcement and encouragement.

You need people who know the system.

There needs to be a desire to succeed, for the team efforts to succeed.

You need to put aside turf battles.

You need leadership skills for directing team efforts, leading, and for providing a vision, motivation, and incentives.

You need skills for facilitation, conflict resolution, and mediation.

Communication skills, including basic writing skills are important.

Planning skills, in general, in addition to the regular planners.

Overall recognition of individual values. The leaders must recognize the strengths of the individual team members and assign work appropriate to individual abilities.

Leaders need a vision of the big picture while the detail people can focus on specifics.

Sociological skills are needed to cover the human dimension.

You may need expertise in economics to try to assess values attributable to expectations, ecological values, biodiversity, and rural values.

You may need to look towards non-traditional views and question the status quo.

There is a need for both specialist and generalist positions to deal with the focused and the big picture type of concerns.

You need to consider different pictures of teams. There are core planning teams,

networking groups, and those who provide specialist support for different teams.

Automation and GIS skills are important.

The employees will need exposure to other specialty areas in order to develop and maintain a better understanding of work efforts.

There needs to be a willingness to learn. Possibly, there could be some incentives, encouragement, and/or other forms of motivation.

People need to be flexible.

Managers can move into expert roles.

Organizations need to give employees permission to fail, that is, employees need encouragement to take realistic risks.

You need self starters, those with initiative.

Look for people that can recognize opportunities for partnerships and nurture those partnerships. Likewise, people that are skilled at recognizing possibilities.

US Fish & Wildlife Service - Chuck Davis, Jane Wayball, Steve Brockman, Pete Ramerez, Kim (field staff)

All field people will need facilitator skills for conducting meetings.

Conflict Resolution skills for managers.

Team Dynamics training for all employees.

Involve local individuals/interests in all planning processes; coordinate across political boundaries, state lines - as in Buffalo RMP, draw ecotype boundaries to the extent of those ecotypes.

Statisticians for monitoring trends and designing studies - NBS for biomonitoring of environmental status and trends?

Demographics/population Biology - NBS?

Botanists, Soils Scientists, Hydrologists
Aquatic Biologists

Conservation Biologists with more of a biodiversity approach than standard fish& wildlife biologists.

Legal aspect - for legal compliance - para-legal in environmental law.

Funding Source Coordinator - to coordinate outside funding sources.

Public Affairs Specialist (Marketing Specialist) to handle marketing - surveying people and defining customers.

Natural Resource Economics

Contaminants training (safety/recognition) for all employees.

Cumulative Effects understanding - GIS will help - roads, etc.

Cumulative Impacts training for planners and for all employees to some extent, also as public education.

Interview Date & Time: 1:00 p.m. January 24, 1994
Location: Environmental Science and Technology Center, Ft Collins
Name: Al Riebau
Title: Physical Scientist
Organization: National Biological Survey
Background: Principle researcher on air quality monitoring project.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-First of all, you have to define what you mean by "on the ground." You can't have it both ways.
-You need a clear perspective of what "on the ground" is in order to clarify your priorities.

-BLM is coordination rich but data poor. You need to collect valid baseline data. You need good consistent data standards that follow scientific methods and provide repeatable and verifiable data.

-Set standards for data collection.

-Use a triage approach-- a standard network approach for monitoring

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Some data doesn't lend itself to GIS. Just because data is on a map doesn't mean its true - frequently misuse to represent whole areas from specific data.

-You need air quality expertise - that's something BLM is lacking in
-Climatology / atmosphere / atmospheric interface

-Surface water hydrology - ground water
-Soil science - vegetative - potential populations

-Simulation models don't work for programs like grazing

-Systems ecology skills might be helpful

-ESTC was a good model. A small group of people working to provide "on the ground" feedback. A small group removed from the bureaucracy to provide scientific expertise. Technology centers need to be attached to State Offices and tied in with a university.

-You need to provide opportunities rather than a fear of failure.

-Technology centers need to be sunset groups, i.e., they need to be reviewed periodically for progress. They need to be theme based, i.e., Systems Ecology of Range Management at Idaho State Office (hypothetical).

-Do away with your budget based organizations

-Have a branch of monitoring

USGS - Water Division - 2 Hydrologists (Barney Lewis and Randy See)

Ecologists
Environmental Engineers
Geomorphologists

Use staff from other agencies for details or contract out to other agencies.

Oversite by a specialist in the organization. Hire generalists at the field level.

Mandatory training - Management
Interpersonal Skills

Interagency/Cooperative Meetings/Committees or details.

Funding to bring interest groups to meetings.

Facilitators

Teams must have management representation for decision making or to give immediate feedback to team to say yes or no.

Coordination among agencies - detailing.

Interview Date & Time 10am, January 20, 1994
Location: Rm 2827, Bldg 25, Denver Federal Center
Name: Tom Albrandt, PhD
Title: Director of Petroleum Geology
Organization: USGS
Background: Dr Albrandt is a native of Veteran, Wyoming.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Interdisciplinary teams - integrated teams - team building
-Participative management
-PI(petroleum industry) production system - GIS/Arc Info - CD roms
-USGS Resources
-Imagery
-Well and production data available on CD rom - regional files
-Barbara Ryans - Water resources
-Reservoir characterization
-Seismic data - (data rescue program) - GS building a seismic library
-Strong linkage between USGS data and BLM
-Oil & Gas is a temporary event
-Resource potential
-Energy gases & non-conventional energy sources
-Naval Oil Shale Reserves - Casper DOE

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Geosciences - geological
-Province geography - Petroleum engineering
-Organic geochemistry
-Geophysics
-GIS
-Imagery

Interview Date & Time: 11:15am January 20, 1994
Location: BOM rm A25, bldg 20, Denver Federal Center
Name: Dave Ferderer
Title: GIS Analyst/Geologist
Organization: Bureau of Mines, Intermountain Field Operations Center
Background: Panel meeting with Galen Knutsen, Chief; Dale Teeters, Mining Engineer; Robert Reisenger, Supv Physical Scientist; Barbara Hite, Environmental Projects Coordinator; Thomas Goonan, Metallurgical/Environmental Engineer;

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Human/socioeconomic issues

-Minerals

-Biodiversity

-Information for basic foundation in Ecosystem Management

-Baselining data adequate for decision making

-Expertise to manage GIS systems - knowledge of the capabilities

-Knowledge of priorities for planning purposes

-Where are the critical areas of concern?

-BLM contacts in Nevada and Colorado

-Integration of information possible under automation technology

-Site specific work needs to be made available

-Cross agency group assessing impacts of mining operations

-Ability to absorb and assimilate information

-Knowledge of how ecosystem uses energy (flow)

-Need for an economic value system for non-commercial resources

Known mineral deposit areas resources of BOM - "Minerals Habitat"

-Abandoned mine lands inventory in Wyoming & related GIS products

-Use of GPS units and photography

-Water quality studies surrounding copper deposits

-Black Hills Ecosystem partnership with Forest Service & BOM

-Coal program site specific resources

-Knowledge of what you have (states have limited knowledge of resources)

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-GIS - data handling

-What if scenarios - simulations

-Geography - spatial relationships - landforms

-Socioeconomic

-Team skills - cross training

-Impact analysis

Interview Date & Time: 1:30pm January 20, 1994
Location: Brook Towers 1020 15th St, Denver
Name: Ranver Singh
Title: Chief, Federal Lands Branch
Organization: Office of Surface Mining Reclamation and Enforcement
Background: Also met with Mel Granberg, Coordinator for Wyoming, Montana, & North Dakota; Steve Anger, Reclamation Scientist; Greg Reed, Wildlife Biologist; Douglas Figgs, Ecologist.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Desired habitat after reclamation
-Hydrology data
-Surface effects of underground mining
-Baseline information - gather data - develop goals
-Restoring land use
-Regulations and applicable laws
-Systems -resource use/disposition
-You need specialists for unadulterated technical/scientific advice, and a higher level generalist with good group/diplomatic skills

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Communication and negotiation skills
-GIS
-Reclamation ecology - focus on specific land use
-Hydrogeology - sensitive to water quality
-Science - technical purists to provide a scientific basis for decision making
-Use an interdisciplinary approach while maintaining technical purity
-Compromises need to be made by application of social/political/policy coordination skills at the appropriate level
-Provide GIS training for data collection & modeling
-Team leader skills - influence over groups
-Public relations skills

AGENCY/ORGANIZATION: *BUREAU OF RECLAMATION*

DATE\TIME: *Tuesday, January 18, 1994*

PERSON INTERVIEWED: *John Lawson, Project Director*

INTERVIEWER: *Bill Mortimer*

QUESTIONS:

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Definite need to look at actions with a "holistic approach"

In reviewing the ecosystem maps, John thought that for BOR to look at the world, watersheds or hydrologic boundaries made a lot more sense. All of their data is on a major drainage basis.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

John was concerned about the ground water hydrology as it related to surface management. He thought that a hydrologist would be needed.

John highlighted Management, communication and negotiation skills.

He also indicated that we would need a good blend of professional skills, indicated that we should be able to draw and share these skills from each other as needed, without a lot of excess work.

Need sociologists and economists involved in the planning aspects <u>and</u> to follow through in the monitoring phase.

Interview Date & Time: 1/26/94
Location: Mammoth Hot Springs, YNP (phone interview)
Name: John Varley
Title: Director, Yellowstone Center for Resources
Organization: National Park Service, Yellowstone National Park
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- suggested a couple of draft documents that would give us an idea of how the Park Service is looking at ecosystem management
  - paper on the biosphere reserve concept
  - NPS - Denver Region - brainstorming session on ecosystem management
  - he will send copies of these
- also recommended the draft of the Greater Yellowstone Vision document - an honest expression of a lot of people's views
  - made the point that there are few things that you need to reinvent - there has been a lot of thinking that has gone into this
- Park Service has most of the skills they need in natural and cultural fields
- lacking in socio-economic fields (made point that social and economic are two distinct fields)
- lack of people who have the grand view of what's happening, on a large scale, in an ecosystem - there are a few who can, but they are rare

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

Social science
Economics
Landscape ecologists (rare)

Other comments

Interview Date & Time:

Location:

Name: *Rick Wallen*

Title: *Wildlife Biologist*

Organization: *Grand Teton National Park*
(307) 739-3300/3484

Background: *Wildlife*

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Communications skills - internal & external.
Conflict between species management and development.
Cumulative effects tracking.
Monitoring representative sites, looking at as many species as possible.
Planning.
Hiring professionals, fewer generalists.
Data management.

Interview Date & Time: 1/11/94
Location: Worland
Name: Worland District Employees
Title: composite of RA and District staff
Organization: BLM Worland District
Background: resource management professionals

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- *communication skills to merge various agency/landowner goals*
- *communication between divisions/districts*
- *interagency communication **data bases***
- *compliance - NEPA followup*
- *exchange capability*
- *training of existing staff to manage ID teams*
- *analysis of public comment/concern*
- *mechanism to cross-cut administrative boundaries to have consistency within an ecosystem*
- *budget - fund interchange between agencies*
- *interpersonal skills for all - coordination*
- *direct access to legal advice*
- *livestock management - more people on the ground - compliance - field presence - more use supervision - back to basics*
- *need people to address changing west - lifestyle, etc.*

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- *Sociologist - zoned or wide area core team member*
- *social scientist to analyze surveys, etc.*
- *broader interdisciplinary type people to lead teams*
    - *more NRS types (generalized - not just O&G)*
    - *editor/team leader*
- *Access specialist at RA level - #1 issue with recreating public*
- *land exchange specialist at RA level - ties in with access*
- *monitoring specialist - zoned but field operational*
- *monitoring team - specialists*
- *computer people - on the ground - RAs - with NR background*
- *hydrologist - in RA - not zoned*
- *paleontologist - zone position to get off archaeologist's (geologist) back*
- *botanist - need zoned but closer - taxonomy and ecology*
- *paralegal skills - dealing with appeals, etc.*
- *wild horse specialist*
- *economist as occasional need or maybe zoned - benefits in having an economist along to talk to clients about economy of change*
- *social/economists - we've avoided these types because they tell us stuff we don't want to hear*
- *facilitator - esp. real facilitator to deal with public*
- *noxious weed expertise - weed can alter whole ecosystems*
- *cooperative (not duplicative) TO with FS, BOR, etc.*
- *anthropologist - esp. related to native american issues - not all archaeologists know enough anthro to deal with N.A. issues*
- *still need skills like geologist, forester, etc.*
- *must include non-renewable resources and economics skills - existing capabilities and skills*
- *we have the people (skills) to do good interdisciplinary analysis*
- *short of leadership - to take on this challenge*
- *environmental engineers in big O&G areas*

Other comments

- *Skills mix result of long term trial and error (planning) but system stops at*

administrative boundaries.
- shouldn't just have range cons write activity plans
- range con - vegetation/livestock specialist - although rancher should be livestock specialist in planning 'team'
- position structure - e.g. soils and hydro maybe zoned but work out of RA - directed to work on the ground
    - not held in reserve to answer S.O. SPECIALS
    - time saver - standardize reports - work with public - we will produce this info and share with everyone
- redefine District staff roles --> more specific function - more than budget
- may or may not get project support from district or state office staff - they do not answer to AM
- don't need more people - just rearrange
- make resource decisions - not bandaids
- empower field level to do the job - plans, agreements
- problem - create position at SO to deal with latest 'hot' program but work load goes to RA
- facilitate retraining/cross-training - allow LWOP to go into another career
- good science is matter of opinion - be perceived as good scientist - encourage professional society involvement - networking
- information sharing - scientific - implementation - encourage to publish
- mix of skills about right now - but need more
- main problem is that we are top heavy
- classify recreation specialists professional - not administrative
- options to contract out specialized needs
- people in SO think they get to field - they don't (refers to zoned function located in SO)
- NBS should be source of scientific basis for decisions
- deficiency in BLM is recognizing what we manage - people - not cows, oil wells, etc.
- decentralize
- general management plan for ecosystem - each agency manage their lands under common goals and objectives
- I&E totally separate from resource management
    - BLM is still going to do what we are charged to do
    - look at those skills that are not involved in ESM
- Define what we are talking about with ESM
- What is role of NBS?
- problem - All agencies going their own direction
- concept is doomed for failure - because nothing will happen
- reservoir management an example of where reorganization happened
- minerals folks concerned about where they fit in
- population growing - need to 'open things up' to support those - we are not a frontier society anymore

AGENCY/ORGANIZATION: *BUFFALO RESOURCE AREA*

DATE\TIME: *Thursday, January 13, 1994*

PERSONS INTERVIEWED: *Richard Zander, Dave Pomerinke, Neil Schiche*

INTERVIEWER: *Bill Mortimer*

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Need to look at more that just the macro?

Need to have the knowledge to describe the ecosystem, from condition to historical perspective.

Data Management was high on their list, Cartographer/GIS at the local level.

Also thought that socio\economic abilities were high to have available all the time.

Outside checks to see how we are doing.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

Ecologist, need to know how systems/components relate

Microbiologist, plant ecologists.

External affairs, facilitators, negotiators, train everyone on some skills but have specialists for facilitators.

Organizational Specialists (OD) to teach employees how to work and communicate with each other and the customer.

Monitoring skills, includes resource and socio/economic areas.

To: Mark Gorges
From: El Spencer
Subject: Skills Mix Study

In response to a page that .....on my desk, I would like to comment on both questions.

Q. What do we need to be a partner ... ???
A. I believe the question is backward. The question is what skills and abilities do others need to become our partner in ecosystem management. In other words, how can we get BLM into a position of being able to bring others into the fold. This calls for a grand scale of education if we intend to get everyone up to our current level of knowledge. I'm sure that is not our mission.

what we could to do is stop talking in abstract terms and concepts, decide on a relatively small geographic area of concern, get interested folks together(not everyone will be interested) to see what they would like to accomplish within the geographic area and design an action plan to that end. Designing the plan would be the hard part. The major skill and knowledge we would need is the nerve to ignore the people that are not interested in becoming partners and not try to manage all resources equally even if no one is interested.

The areas where we do need additional skills and knowledge is determining what we have to manage(current conditions) , how much can we change the things we manage(potential) and how do we get other owners and managers to coordinate and manage their property in concert with BLM. These needs are what is identified in number 2.

Q. What professional skills do we need.... ???

A. I have become ever more convinced that we know very little about the amount of resources we have(inventory), the condition of those resources and effect of our past management practices(monitoring) or the potential of an area to respond to management. This is not a reflection of the skills and knowledge our staff has, but is rather a result of the priorities and type of duties assigned. We continue to demand more management plans, developments, public input, environmental analysis, move on to new locations, etc. with little time/effort spent analyzing what we have done and what the results have been of past management actions. Often each subactivity has been allowed to do these things on their own pet areas and then yell at each other for lack of coordination.

What this all means to me is that:
a. By-in-large I think we have the technical skills and knowledge we need. They may not be located in the proper places or the exact number needed, but I can't figure that until we try something.

b. The majority of what skills and knowledge we need to acquire or exercise 4S what I would classify as management control. --we need the skills to better manage our reaction when the political processes elevate and accelerate some action or resource over the others. The same can be said for internal actions that do the same thing.

--We need management skills in how to set work priorities that will allow us to gather the basic knowledge needed(inventory, condition and potential) to do an adequate job. Then get on with the management plans.

--We need to manage the time needed to coordinate with the interested parties

-- managers need to know how to make work assignments and sustain that direction inspire of employee or public pressure to change to their pet projects.

In summary, I think we need more additional management skills than professional skills. If we could get the first, maybe the second need would not be as great.

January 24, 1994

Hi Mark-

I've read your short note on ecosystem management and agree with the assessment of our mandate and how we are going to carry it out.

How does the Hazardous Materials program contribute and become a part of the Ecosystem Management concept, well....

Basically the Hazmat program is about protecting human health and the environment from potential and real impacts that derive from the use of hazardous substances on public lands. Many of these substances are a legitimate, necessary part of doing business in an industrial society, however we do have occasional, criminal dump sites that occur. Regardless of whether or not a release of a hazardous substance to the environment is criminally intended or not the impact to the soil, water and air resources is the same.

We manage the soil, water and air resources from the standpoint of preventing or mitigating the impacts from hazardous substances. A key element of this approach is Pollution Prevention and planning. We work closely with industry in planning their proposed activities to see if there are things we can do "upstream" to avoid impacts from hazardous substances in the first place. Dealing with the downstream end of things, regulatory and statute enforcement, is very expensive for all parties involved.
In working with other BLM programs, we need to ensure that proposed activities by these other programs are not going to be impacted from the effects of hazardous materials and related activities.

Skills mix: soil scientists, hydrologists, geologists, other related physical science backgrounds.

Gerry Federer - Needed skills are currently onboard/people management skills.

El Spencer - Education of all interested parties as to what ecosystem management is and what we are doing, but is that part of our mission?

- We have the technical skills and knowledge that we need.
- Management skills to coordinate individuals/teams to focus on assignments and get necessary work done efficiently.

Dave Roberts - Work load analysis, then match skills to cover the workload in each office.

- Double/triple hatting is not the best; the individuals main skill/background is still going to get a disproportionate share of the work/interest/concern. The secondary jobs will get the secondary status.

- Cross trained individuals need professional skilled people overseeing work as at the District.

- If teams are to work, all resources must be on an equal footing; the commodity resources cannot run the programs.

- Must keep focused on what our agency resource management mandate is; take into consideration economics, sociology, etc. but we are a resource management agency.

Rick Schuler - Facilitators for public input.

Developing programs and initiatives include:

- increased Federal and State emphasis on Clean Water Act compliance, in particular the Non-point source program and associated incorporation of water

quality objectives, BMP implementation, and subsequent water quality monitoring into activity plans

- the development and review of Stormwater Discharge Management Plans for land disturbing activities on public land

- the enhancement of outdated soil surveys (and completion of surveys in areas that have not been surveyed) with the development of expanded interpretations for use in riparian surveys and management, watershed plan development and implementation, pipeline right-of-ways, etc.

- expanding the salinity control program in SW Wyoming in cooperation with the State Engineers Office, DEQ, and the Salinity Control Forum

- coal bed methane extraction and the associated need to assess and monitor/manage production impacts to ground water aquifers

- Range Reform and the need to assess the effects reform actions and BMP implementation on soil and water resources

- the expansion of trona and energy production activities in SW Wyoming and the effects on air visibility and quality

- Ecosystem Management...which incorporates (addresses) most of the concerns mentioned above, all of which must be considered in a comprehensive and interrelated manner

These developments necessitate the following mix of skills and abilities;

- soil scientists and hydrologists, full time, in each RA office
- an operational air quality and climatology specialist in the State Office
- a lead soil scientist and hydrologist, full time, in the State Office
- resource advisors in each District Office

The "minimum standard" need would be:

- zoning of the State based on river basins (these correlate well with the present District Offices) with a soil scientist and hydrologist (super techs) in each zone with a staff of 2-3 field techs (soils and hydrology) to provide operational assistance to zone field offices. The super techs would function with District Teams but would also function as a State-wide self directing team (for overall management of soil and water resources within the State)

- a soil scientist, a hydrologist and an air quality/climatology specialist are needed in the State Office to function in interdisciplinary teams at the State Office level for networking with Washington and State Agencies....as well as provide leadership and guidance to the Zone SWA Resource Teams.

A few, part-time "general practitioners" in the field offices will not be able to address the technical needs (management) of the soil, water, and air resources in the context of ecosystem management or adequately devise the strategies and techniques to compliance with more stringent water and air quality laws.

Also, I question the need for 2-3 levels of "mid-level" managers in the new organization in which experienced specialists are functioning in self-directing teams with a small contingent of facilitating leaders.

To: Bill Daniels

From: Gary McVicker

Subject: Skills

Attached are two papers that way be of interest to you. I drafted one in response to a request for input into a bureau-wide study on skills needs which Brain Bernard is involved in. It's rough and quick, but perhaps has some useful information. I believe that it's not simply 'a question of skills needed, but that we also need to look into a variety of other related questions such as teams, networking with other agencies and entities (e.g. universities), how we use these skills in a new organizational environment, how to create that new environment, etc. I would be glad to discuss these things further if you like. Hopefully, the paper does a fair job of raising some of these questions, but it was not intended to pose answers....heaven forbid.

The second paper was drafted by Dale Brubaker and others relative to a look at skills needs in Colorado. You I 11 note a lot of similarities. They were developed independently, proof again that we are all thinking somewhat alike.

Hope this is of use to you. Always good to share thoughts and ideas. I would be interested in your conclusions.

Regards,

Gary

revised 1/20/93, McVicker

Ecosystem Management 1- Current Thoughts Regarding Human Resource Implications
Attempting to look ahead at skills and expertise required for ecosystem management in the bureau is complicated by several considerations. For example, there is discussion pertaining to the formation of teams of expertise to function on a collaborative basis. Whether there will be teams, how they are to be structured, what skills are presently available within the bureau for such teams, and what others may be acquired through partnerships and interagency networks are all questions remaining to be answered. It :La also exceedingly important to rethink processes, organizational culture, and roles and functions if new expertise is to be used effectively.

Certain work (such as grazing administration, realty case work, oil and gas lease management, data management, etc.) now being performed by potential sources of expertise obviously must continue. How to continue such work while freeing up expertise is just one of the problems that must be dealt with in the transition to ecosystem management.

For purposes of this report, answers to these and other questions must be left as unknowns. A simple attempt is made to identify some of the skills and expertise that may be needed. The apparent nature of work to be performed and considerations for acquiring, placing, and using these talents are also discussed.

<u>Ecologists</u>: In turning from a program oriented approach for managing natural resources to one based upon the understanding of ecosystems, perhaps the most obvious area of new expertise is that of ecologists. Beyond this simple assumption, things get far more complicated. For example, understanding ecosystems and biological diversity is, in part, a function of scale, ascending from the site specific to ever larger dimensions. Information for the larger dimensions may, in the near future, be provided through the National Biological Survey (NBS) , the Environmental Protection Agency,'s (EPA) EMAP program, and through collaborative relations with agencies and universities. For BLM to be a meaningful participant in such efforts, recruiting ecologists at upper levels may be a consideration. This is particularly worth looking into since BLM manages much of the more desert environments of the West where expertise may not be readily available from other sources.

Ecologists should also be considered for more localized expertise at the field level. Before recruiting ecologists at this level however, their roles and functions need to be considered. It has already been experienced that ecologists brought into the current field setting of BLM experience considerable frustration and confusion over their roles. Likewise, traditional resource personnel in these situations may also be concerned, believing that the position should have been used to augment their particular programs. However, there are successes too. In one example, ecologists are being used to direct monitoring and serving to translate data to knowledge of the local ecology. In this capacity, the ecologist plays a pivotal role among various program personnel to both facilitate and influence the direction of their work. Perhaps this can be viewed as an effective step toward interdisciplinary teams correctly reorienting to ecology, rather than multiple programs.
Other comments concerning the subject of ecologists are contained in some of the following discussions.

<u>Soil Scientists</u> In its recent history, BLM has been relatively well staffed with soil scientists. The fact that the bureau has greatly reduced that expertise may raise questions as to its need in the future.

Previous efforts at using soil scientists were almost entirely centered on soils inventory and classification. Although inventories continue (generally under contract with the Soil Conservation Service), completion is still years away at the present rate of progress. Whether restoring the bureaus own cadre of soil scientists is needed to facilitate these inventories, and to apply the information to land management, is one area that needs to be examined. In doing so, other

sources for acquiring this expertise should be considered.

Transition to ecosystem management may imply other, even more important considerations for the bureaus future use of soil scientists. Various efforts are underway to develop better methodology for understanding and monitoring ecosystem health. One such effort involves soil ecology, whereby the presence, abundance, and array of soil organisms might provide meaningful information relative to site health and productivity. The NBS may also be looking into this area.

While the importance of soil science to ecosystem management is evident, the exact nature of expertise needed and its potential sources to the bureau are far less clear at this time. We should generally exercise caution against recruiting people in this area merely because of the apparent need. Rather, such recruitment should be governed by consideration of other sources available, and in view of new developments in the science itself. Restoring some of the soils expertise lost in recent years may be a critical first step in beginning to answer some of these questions and laying a new foundation in this important area of expertise.

<u>Statisticians</u>: BLM has attempted to use statisticians in the past without much success, except in forest inventories. Is there a reason to think that this expertise will be needed for ecosystem management? Perhaps, since ecosystem management will bring new demands for effective monitoring and information gathering.

As a start, the bureau probably should review its existing monitoring programs. What is being done now may have limited utility for ecosystem management, and it may be ineffective even for current uses. While some of the data being gathered is no doubt being used effectively, a considerable amount may be winding up in desk drawers without evaluation. In other examples, conclusive data may have already been gathered but not recognized as such, resulting in continued data gathering. Also, data gathering from different locations is seldom being examined collectively for purposes of efficiency or deciding it's broader application.

Other considerations for statisticians are in the areas of data management and Geographical Information Systems (GIS). Combinations of expertise, such as biologist/statisticians, economists/statisticians, etc., may serve to help overcome the problems discussed above while also supporting the management of information and GIS systems.

By establishing organizational units and processes for the management of data gathering, translating data to knowledge, and maintaining contacts with other sources of information, the bureaus monitoring and inventory efforts might gain greater efficiency and be more effectively oriented to the needs of ecosystem management. This does not suggest centralization at the expense of supporting local needs for monitoring and data gathering.

Wildlife Biologists Hunting and fishing have historically been, and will continue to be, an important feature of public land management. Much of the wildlife expertise the bureau presently has was schooled in this aspect of wildlife management. While recognizing their continued importance to the bureau, many people primarily serving this capacity cannot be expected to cover the areas of biological expertise needed for ecosystem management.

On the other hand, the bureaus existing workforce of wildlife biologists have demonstrated considerable capability in handling a wide variety of challenges, ranging from endangered species recovery to the management of special areas, such as the Arizona's San Pedro Riparian area and Idaho's Snake River Birds of Prey area. Clearly, the agency has considerable diversity and capability within its existing cadre of wildlife biologists.

Nevertheless, for ecosystem management, the variety and degree of specialization for biological information will likely far exceed the bureaus existing capability.

The need for partnerships with other agencies, universities, private sources, and NBS is especially evident in this category.

Perhaps more than partnerships, we should be looking at establishing networks for information and expertise serving various ecosystems. By first stratifying the land bass into its ecologically significant areas, we could better understand the types of expertise needed. In some cases, it may be advisable to hire new expertise in addition to forming linkages with other sources.

A team comprised of multi-agency representatives, including the NBS, might be formed to explore the potential needs for expertise and ways of securing them.

Range Conservation without effective range management on bureau lands, oriented to the restoration of healthy native plant communities, such goals as biological diversity, water quality, soil stability, etc. will not likely be attained under ecosystem management.

Much of the bureau's range management personnel are now encumbered by a variety of demands which limit their ability to become highly proficient in the areas moot important to ecosystem management (e.g. plant physiology, plant phenology, plant ecology, grazing prescriptions, etc.). The same individual is often involved in grazing administration, rangeland supervision, rangeland improvement work, monitoring, planning, and other work. Ways of relieving these workloads and specializing the existing rangeland management workforce to serve needed areas of expertise are recommended as a first step.

One consideration might be to employ lower cost personnel to relieve the burden of such things as grazing administration (i.e. range clerks) and rangeland supervision (i.e. range technicians) . Another is to hire a seasonal work force to do much the monitoring work. Many communities have well educated people available in the summer months from the local school system who, once trained and experienced, can be available year after year. Such options may be advantageous even if some professional positions have to be given up, allowing remaining range conservationists to concentrate more on pursuing greater expertise and effectiveness in needed areas.

But the need to recruit and distribute new expertise to help in the reorientation to ecosystem management should not be ignored. Many of the bureaus existing rangeland management personnel are more oriented to livestock production than to the management of native plant coities. While both goals may be important, emphasis on the former often overshadows the latter.

Reorientation to the management of native plant communities while meeting the economic needs of livestock operators has long proved a difficult undertaking. It deserves a new start, one which must consider agency culture and how to change it. Many universities are now turning out rangeland management students already oriented to the principles of ecosystem management.

<u>Foresters:</u> Traditional forest management practices are being severely challenged under ecosystem management. Principles of sustained yield, using a variety of technologies oriented to maximize wood fiber production, are giving way to practices oriented to maintaining a host of biological processes and systems associated with forest and woodland ecology.

One thing is already evident. Allowable cuts in the most intensively managed forests areas will decline. But other implications are less clear. For example, fire protection has definitely changed forests and woodlands throughout the West, and it may be that the resulting habitats and ecology are actually contributing to the declines of certain associated species. Considering this and many other unanswered questions, predicting the future of forest and woodland management becomes even more difficult. There are those that argue that harvest levels should be increased in some areas to help restore former ecosystems- It will likely be an evolutionary transition, involving social, economic, and ecological considerations being played out variously at many different locations,

each with its own unique considerations.

In terms of personnel, BLM is certainly faced with reductions in those areas where intensive forest management and high production levels have been the practice. But this should riot reflect the overall future of forestry in the bureau. As ecosystem management progresses, we will likely have the need for other forest and woodland management expertise, particularly forest ecologists and fire ecologists.

Economists and Sociologists: To date, economic and social evaluations have been performed rather linearly, with trade-offs against environmental considerations being left to review under the National Environmental Policy Act and ensuing political, legal, and public debate. Ideally, ecosystem management should provide for the integration of socioeconomic considerations and environmental objectives. This presents great challenges which will likely call for both new processes and expertise. In considering this future, the bureau should also be mindful of the rapid economic and social changes underway in our society and globally. These are also evident in the West and have already affected many rural communities in which BLM is involved.

The exact nature of expertise needed, how BLM acquires it, and how to effectively use it are difficult questions to answer at this time. Collaborative relations with other agencies, local governments, and universities may be the best avenue. However, as with some of the needs discussed above, recruiting BLM's own expertise should not be ruled out. Two important questions to ask before doing so are, "How do we effectively use such expertise in ecosystem management?', and "What new skills are needed or available to insure more holistic applications of these sciences?".

External Affairs Specialists: Although this classification is perhaps not the correct one for our purposes, it will be used to discuss a most important area for consideration in ecosystem management.

In a very real sense, ecosystem management can be viewed as a social process. To effectively serve its purposes, changes in paradigms, philosophies, and human relations must be pursued. Success will only be possible through change among agencies, public land users, interests, and local governments at all levels of society. So, in addition to the science categories discussed above, the bureau should consider people skills as an essential attribute contained within its workforce under an ecosystem management approach to business.

Interpersonal skills are already evident in much of the bureaus existing workforce, but ecosystem management demands more. To coalesce disparate values and interests into a working unit pursuing goals in the interest of all participants has been compared to techniques used in treating dysfunctional families. Certain skills and insights into human behavior are required, as is a high degree of trust. Selecting, training, networking, and relocation of people exhibiting these characteristics may be the first step to transformation. Because this work is so critical to BLM's success in ecosystem management, these steps should be viewed as elevating people affected to a more important position in the agency.

As indicated, this work needs to be performed at all levels of the organization, but it is probably most important at the field level. Accordingly, further discussion on the future roles of range conservationist is warranted. The forming of successful relations with and among livestock operators and other interests is essential if needed changes in livestock management practices are ever to be widely adopted. Trusted and skilled bureau personnel are essential to this end. In many instances, range conservationists possessing such attributes may be the most effective, considering the importance of grazing management on the public lands.

Other: A variety of other expertise may be required to serve the human dimensions of ecosystem management. Native American cultures, Hispanic cultures, local

history and archeology, and various other human related factors, both past and present, need to be understood and possibly represented in the bureaus future workforce. This is an area primarily for localized determination of need, not bureau-wide. Such expertise may include anthropologists, historians, ethnohistorians, or special expertise in local cultures.

drafted by: Gary McVicker 1/18/94

STAFFING NEEDS

ECOSYSTEM Management CONSIDERATIONS

A. *SOIL ECOLOGIST - NEED SKILLS TO DEAL WITH WILD LAND SOIL/PLANT RELATIONSHIPS - FLORA AND FAUNA OF Soils - MICROBES BACTERIA AND INSECTS. --- NOT AN AGRONOMIST - NEED ONE PER DISTRICT AND OR LARGE RESOURCE AREA.*

B. *PLANT ECOLOGIST - NEEDED FOR THREATENED AND ENDANGERED PLANTS, SENSITIVE SPECIES, NEEDED FOR VEGETATION MONITORING, NEED SOME STATISTICAL TRAINING, - - NEED ONE OR TWO PER RESOURCE AREA.*

C. *ENTOMOLOGIST - NEEDED FOR ENDANGERED SPECIES WORK INTEGRATED PEST CONTROL WORK - ECOSYSTEM MONITORING - NEED ONE PER STATE.*

D. *FOREST ECOLOGIST - NEED A BALANCED FORESTRY EDUCATION THAT WILL DEAL WITH BOTH ECOLOGY AND COMMODITY PRODUCTION - MUST NOT BE EXCLUSIVELY ECOLOGY ORIENTED - NEED ONE PER DISTRICT To DEAL WITH FOREST ECOLOGY AND PERHAPS ADDITIONAL POSITIONS FOR COMMODITY PRODUCTION. - THIS IS A REORIENTATION OF OUR TRADITIONAL FORESTRY POSITIONS.*

E. *RANGE ECOLOGIST - NEED A BALANCE BETWEEN ECOLOGY AND COMMODITY ORIENTATION - NEED ONE PER RESOURCE AREA THIS IS A REORIENTATION OF OUR TRADITIONAL RANGE CONSERVATIONIST POSITIONS.*

F. *A COMBINED ARBITRATOR/COMMUNICATION SPECIALIST -- THIS POSITION IS VIEWED AS HAVING SKILLS TO DEVELOP THE COALITIONS NECESSARY FOR ECOSYSTEM MANAGEMENT AND OPERATING BOTH INTERNALLY AND EXTERNALLY. (E.G. INTERNALLY - STAFF WILDLIFE INTERESTS VS STAFF O&G LEASING INTERESTS. EXTERNALLY - BUREAU WILDLIFE CONCERNS VS STATE AGENCY WILDLIFE CONCERNS VS LIVESTOCK INDUSTRY CONCERNS.) ADDITIONALLY, THE POSITION WOULD CONTRIBUTE TO DEVELOPING EDUCATIONAL MATERIALS, ENVIRONMENTAL EDUCATION, AND PUBLIC AFFAIRS EFFORTS. -- NEED ONE PER DISTRICT PLUS ONE FOR SAN JUAN, ONE FOR WHITE RIVER, AND ONE FOR GLENWOOD SPRINGS.*

H. *SOCIOLOGIST/ECONOMIST ORIENTED TOWARD COMMUNITY RELATIONSHIPS TO PUBLIC AND PRIVATE LAND ISSUES. - NEED ONE PER STATE MAY BE ABLE TO GET THIS SKILL FROM BOR AND/OR NPS, BUT IT IS UNCERTAIN THAT THOSE AGENCIES HAVE PERSONNEL CAPABLE OF ASSESSING THE SUBTLE CHANGES RESULTING FROM MARGINAL CHANGES IN RESOURCE ALLOCATIONS.*

I. *STATISTICIAN - AS WE MOVE TO HIGHER LEVELS OF VEGETATION MANAGEMENT WE MUST MOVE To BETTER AND MORE RELIABLE INVENTORY AND MONITORING WHICH WE CAN ONLY ACCOMPLISH THROUGH WELL DESIGNED SAMPLING SYSTEMS. -- NEED ONE PER DISTRICT - PERHAPS THIS COULD BE COVERED WITH A STATISTICS SPECIALIZATION IN THE PLANT ECOLOGIST POSITIONS IDENTIFIED ABOVE OR THE DATA QUALITY ASSURANCE POSITION IDENTIFIED BELOW.*

J. *FISHERIES BIOLOGIST/AQUATIC BIOLOGIST TO DEAL WITH THE AQUATIC ASPECTS OF THE ECOSYSTEM- .- NEED ONE PER DISTRICT*

H. *HYDROLOGIST THAT CAN RELATE To THE HYDROLOGIC CYCLE SEDIMENTATION, ETC. NEED ONE PER DISTRICT PLUS ONE IN SAN JUAN AND ONE IN MEEKER.*

K. *DATA QUALITY ASSURANCE/QUALITY CONTROL SPECIALIST To SUPPORT DATA COLLECTION AND ANALYSIS OF THE ECOSYSTEM AND DATA AND SYSTEMS CONSISTENCY BETWEEN INTERESTED PARTIES. THIS POSITION MIGHT COVER THE NEED FOR A STATISTICIAN-- NEED ONE PER DISTRICT*

IRM CONSIDERATIONS

A. *TECHNICAL SPECIALISTS TO SUPPORT INTEGRATION INTO AND OPERATION OF THE MODERNIZATION EFFORT. - NEED ONE PER DISTRICT PLUS ONE IN SAN JUAN AND ONE IN WHITE RIVER.*

Interview Date & Time: 1/14/19 10:00 AM
Location: Billings, Montana
Name: John Moorhouse, John Thompson, Tom Lahni, etc.
Title: Montana State Office L&RR, Minerals
Organization: BLM
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- Economics! (What do you expect from an economist)
- Coordination skills will be very important. Montana had no ideas what was going on in the National forests in Wyoming. Nobody knew anything about what the Indians in Montana were doing.
- We need to look at projects that are already underway to determine the skills needed (Loise Olson - Helena)

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- Biohistorian
- Fire history
- The skills needed to manage for natural vegetation are lacking. discussion of how capable we are in managing for natural veg.

Other comments

- There was quit a bit of discussion on the need for regional and national program direction. Most of this was directed at the minerals program.

Interview Date & Time: 2:30pm, January 13, 1994
Location: Rm 204 Law School Bldg, U of W, Laramie, WY
Name: Deb Donahue
Title:
Organization: College of Law, U of W
Background:

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Research agreements with universities.
-Early on cooperation
-Environmental natural resources studies are aimed at producing problem solvers.
-Sampling techniques need to be consistent-- planning.
-Work with the Nature Conservancy and the Heritage Program
-Apply a cooperative team approach to everything you do.

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Communicate within the teams better. Review each others work from your own perspective.
-Knowledge of the various applicable laws or how to find out what the laws say and mean.
-Maintain connections between the various components such as biodiversity, realty, and ecology.
-Get the various entities working together; use all available tools; preserve the linkages.
-There may be a need for an intergovernmental coordinator type of position to maintain feedback and continuing cooperation, e.g., vegetative treatments.
Maintain a consistent effort to keep each other informed.
-Know who you are talking to.
-People and communication skills
-Motivation skills to keep the staff believing it is all worthwhile.
-Less hierarchy - more empowerment
-Compensate (pay) people what they're worth regardless of their place in the organization.

Interview Date & Time: January 13, 1994, 12:00 p.m.
Location: University of Wyoming, Ag Bldg.
Name: Bob Fletcher
Title: Professor
Organization: Agricultural Extension and Economics
Background: Economist

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

Need to know and understand the trade-offs between different systems that are represented by markets. Water is a major factor of dependency. Need demography to interpret data. Need economists to analyze and synthesize the data. National data bases exist and these must be available and understood. Automation of data is an ability that must be available. Continuity of data across agency lines is important. Use the same data collection models and GIS systems. Understand the GIS system well.

Ability to work together. Modeling important. Must be able to ground truth data. University links, such as extension to agencies efforts on the ground are important data ties. Need to better understand the social community of the rural parts of state. How people's values are reflected in what they do. Attitude surveys are good for this.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

Data manipulation and collection. Understanding of socio-economic impacts. The use of benefit-cost information. Understanding long range goals of local communities and their leaders both formal and informal. Correlating information, doing tradeoffs, political impacts, local economies, and threshold analysis are important. For local economic analysis and understanding that part of ecosystems, the economist is a must.

Interview Date & Time: January 13, 1994, 1:00p.m.
Location: Rm 2013, Ag Bldg, U of W, Laramie, Wy
Name: Bill Laycock
Title: Professor
Organization: Agriculture Dept. Range Science
Background: range science, grazing, livestock

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

The knowledge or abilities vary by the definition of the ecosystem. Is it species diversity, habitat diversity or something else? Desired Plant Community exists on that rangesite somewhere if it is to be called as such. For what reasons should that desired system exist? What are you going to use to define it? Energy flow, nutrient cycle or what? We need to broaden the desired plant community concept toward the landscape level. What you want may not exist there anymore and for a good reason. Desired Landscape Condition is the same concept on that scale.

The interpersonal skills are the most important, writing, communication, negotiating, collaborating are extremely important. The technical understanding is also parallel in importance. You must bring some credentials to the negotiating table. Conflict resolution is a must. Train your folks in dealing with people.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

Get people well rounded in natural resource management. They should be generalists in ecosystem understanding. The technical specialists are also necessary for data collection and monitoring. Degrees in ecology and applied ecology are needed. The specialists should understand ecology and specialize within their field in this aspect. So we have range ecologists, fisheries ecologists etc. They have to understand the systems and the interactions of resources, not just be pure classical ecologists. Applied ecology is the direction to move. Holistic ideas are interspersed in our coursework but not an entire study to itself. People should be sent to other countries to study resource problems, where they are more acute. We can really learn from others problems and will also find out how well we have it.

The pure ecosystem concept will have a difficult time getting to resource management on the ground. The manager will need all the skills at hand at times depending on the project or problem at hand. They should be available whether they are necessary at the local level depends on how much they are used. We need all the specialists to provide input to decisionmaking as team efforts. Need to be able to ad hoc the teams and contract for expertise where it does not exist in the agency.

Interview Date & Time: 2:30, January 13, 1994
Location: Room 408, Biological Sciences Bldg., U of W
Name: Evelyn Merrill, Phd.
Title: Professor
Organization: Zoology Dept. University of Wyoming
Background:

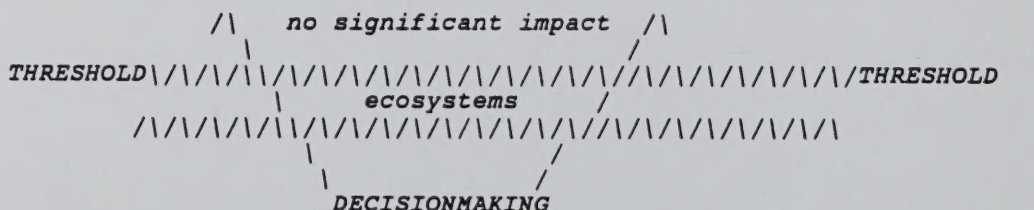
What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

Why do we want ecosystem management, the objectives are critical, use caution when dealing with boundaries. You should maintain some flexibility in management strategies, use adaptive management. Focus on the processes, ecosystems are integrative. The systems are the important aspect, and a systems analyst is imperative in understanding the ecosystems. This does not mean that the other disciplines are not important, just that the systems understanding and the interaction of species is the important and difficult part of the study and understanding of ecosystems. You cannot train a person to be a systems analyst, they have to have a basic education and grasp of mathematics, and I feel they have to be integrated into the program. These people are modelers who can link those who do not always link well. We who study animals do not always link well with the other disciplines, and we need the type of systems person who can ask the right questions of the other professionals to bring the interactive linkages to life. They put into mathematical statements the what makes things work together.

You need integrated planning and interdisciplinary training for personnel who are going to study and understand ecosystem management. The conflict resolution training is also important. Folks should be able to work together in teams, they should have good interpersonal skills.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

The technical skills are all important, but you also need the integrator, the planning oriented skills as well as the systems persons. The GIS oriented person is also extremely important. The data collection into compatible formats is imperative. Data sharing between agencies, Universities, and cooperating groups requires that expertise on the team. Process orientation requires that knowledge of how processes are affected by decisions made by management. Ecosystem health must be understood, if it is to be maintained for future generations, the state of the ecosystem is not the important knowledge, but the processes and the trend in these is important. How does the management decision relate to these or affect how these processes function. Ecosystem health must be defined with threshold levels. Decisions are often driven socio-economically, and how are these driving the system toward a threshold? The system may be affected to a point without irreversible impact, but then as you push the system toward a threshold, you may never recover it. A restoration ecologist will understand where the system thresholds are located, and how to best try to bring the system back to an equilibrium.



Conservation biologists use theory a lot and there is nothing wrong with this, but you need the adaptive types that understand decisionmaking to make up a team.

Adaptive management and a systems approach toward managing is necessary. Monitoring and trend analysis are needed. Public input on the desired future condition goes along with the data collection and synthesis to get to a sustainable condition. In the setting of objectives, it must be remembered that there are no absolutes. The systems are always in a state of change. She would suggest some areas for prototypes or study areas for more intense management, and understanding of the ecosystems and how they work.
The question is how social and economic systems can be adaptable to the dynamics of the ecosystems? Is this going to evolve into a culture change? The systems people need to be put into strategic places. People for those jobs must be chosen for personality and insight.

The modelers may help us to get to adaptive management, help provide a framework to work in, and ask the right questions of all the team members. The questions help us to gain insight into the system components.

Suggests contact with the Universities to get technical skills or to be advisory by contract. Need is to interact with all the interests, perhaps with a steering group input for general review.

Interview Date & Time: 10:00am, January 13, 1994
Location: Laramie, WY
Name: Bill Reiners
Title:
Organization: Botany, University of Wyoming
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?
First priority is a clear and widely accepted definition of "ecosystem and

ecosystem management" within the Wyoming BLM organization. Second priority is developing a hierarchical system of land classification extending from sub-continental to "stand" units. Third priority is characterization of these hierarchical classes on climatological, physiographic, and biological grounds. Fourth priority is development of spatial and feature database systems for these units. Fifth priority is development of an understanding of interactions that extend between (across space) parcels of land in unlike land classes. Sixth priority is development of a priority-based decision-making process.

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

Required professional skills are dictated by the steps set forth above as priorities. Obviously the organization needs some internal leadership in coming to operational definitions about "ecosystems" and "ecosystem management." This is a difficult task. Beyond that are needed geologists, soil scientists, plant ecologists, wildlife and fishery biologists. These kinds of skills are already in place in the BLM. Perhaps areas needing reinforcement involve spatial data (remote sensing and GIS) and database organization and maintenance. Somehow, people with skills in group dynamics, resolving priorities and coming to consensual decisions need to be involved. It is not clear to me where they are to be found.

Interview Date & Time: 1pm, January 13, 1994
Location: Rm 311 or 304 Aven Nelson Bldg, U of W, Laramie, WY
Name: Ron Hartman, PhD
Title: Curator & Professor of Botany
Organization: Rocky Mountain Herbarium
Background: 16 years as curator RMH & field experience in Wyoming

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Knowledge of what organisms inhabit certain areas and species that may be in need of protection.

-Specialized botanists that may be available through partnerships or cooperative agreements with the universities or organizations such as the Nature Conservancy, Natural Heritage, or the Wyoming Natural Diversity Database.

You need to be able to see the big picture and be able to equate patterns to what's going on.

Graduate students are good sources to conduct inventories.

-GIS/Remote Sensing courses are available. We work with Bill Gribb in Geography.

-Plant identification, particularly in riparian areas.

-Maintaining biological diversity.

-Consolidation and integration of data.

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

You need a range conservationist or botanist that knows plants (taxonomy).

-Ecologist, possibly landscape ecology.

-Remote sensing/GIS and coordination with the botanists and/or range conservationists.

-Horticultural skills. The Denver Botanical Garden would be a source.

-Reclamation-- restoration ecology, fire restoration ecology.

-Biological control of pests.

-Plant, soils, and insect science. Bob Levine & Jeff Lockwood.

-Weed Sciencep
-more training and education

Interview Date & Time: 1/18/94
Location: Bozeman, MT
Name: Bruce Maxwell
Title: Plant Ecologist
Organization: MSU, Dept. of Agriculture
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- *Bringing people together to develop common goals*
- *common data - manage data that we already have*
- *GIS - common between others*

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- *landscape ecology and related disciplines - emerging field*

Other comments

- *current research team looking at:*
    - *Sustaining economic base of small communities - changing - how does agriculture fit into change*
    - *integrating changes in uses with need to sustain ag uses*
    - *team: socio, econo, pol. sci, soils, plant ecology*
- *also putting out a primer on what to do with land for new landowners - working with SCS*
- *lacking good science base - the science is not really there yet*
    - *ex. space scales-->time scale - how they interact*
    - *ex. exchange between vegetation types*
    - *just learning specifics of specific ecosystems*
- *University more and more tapping into ???*

Interview Date & Time: 1/19/94
Location: Bozeman, MT
Name: Pat Leggi
Title: Paleontologist
Organization: MSU, Museum of the Rockies
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- *need consistent management across agencies*
- *have people that can understand problems and deal with them*
- *need places like Museum of the Rockies - none in WY*
- *need more monitoring capability - more people in field to see what's going on*

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- *paleontologist- is BLM looking at actually managing the resource?*
- *need specialists (paleo) - dino, mammal, etc.*

Other comments

- *pending legislation first - then agree to some types of regs*
- *they are heading toward broader expertise, eg. not just vertebrate paleo*
- *want to be major repository for federal land stuff*
- *would be better if BLM is assisting in research*
- *look at other models to determine structure of paleo staff*
- *BLM archaeo program is good model of where paleo program need to go*
- *WY BLM MOU is a 1st - a model*
- *would like to see what we put together on paleo program structure*

Interview Date & Time: 2pm, January 21, 1994
Location: 200 Natural Resources Bldg, CSU, Ft Collins, CO
Name: E. Tom Bartlett, PhD
Title: Professor
Organization: Rangeland Ecosystem Science, Natural Resources, CSU
Background: With Larry Rittenhouse, faculty member

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Connect with the budget process
-Communicate with the Forest Service
-RREA proposal is in for Workshop on Ecosystem Management for two weeks in the spring of '95 with one week followup field work in the summer
-Ability to get along with people, especially the stakeholders
-Enrolling non-traditional stakeholders for proactive support - showing what's in it for them
-Students need more experience/knowledge/savvy of management
-To integrate you need to segregate that which changes from what doesn't

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Social skills for dealing with people, communication, and conflict management
-Social, cultural, and political skills
-Basic understanding of automated systems and trust in those systems
-Multi-level monitoring with adaptive feedback
-Might need to work with models to solve problems or educate but probably don't need modelers

-Skill with software on adaptive feedback systems --Don Jameson

-You can hire technicians to do the technical work

-You need people skills to develop trust

-Integration of the systems

Interview Date & Time: 3pm, January 21, 1994
Location: Rm C244, Clark Social Sciences Bldg, CSU, Ft Collins, CO
Name: David Freeman, PhD
Title: Professor & Chair
Organization: Department of Sociology, CSU
Background: Dr Freeman recently delivered a presentation on "The Human Dimensions of Ecosystem Management: Understanding the Problem and Developing Solutions" at the Rocky Mountain Ecosystem Symposium.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming? Can Social Scientist interact with Natural Scientists in understanding the ecosystem?

-The typical PhD scientist is not prepared to interact with interdisciplinary teams--they tend to be more into their own agenda

-You want to work with specialized knowledge groups, that want to be applied, then look for those interested in natural resources

-Applied sciences-- Interdisciplinary and multi-disciplinary-- Start out with multi-disciplinary teams and after a few years (about 10) they will learn to interact interdisciplinary

-Demographics -- Reed Reynolds is the State Demographer, Ed Knopp is in contact with him

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM? How can we work social science into the equation of employees or available resources?

-Rural sociology skills would be important to BLM Wyoming

-Ability to relate to other disciplines

-Cooperative agreements with Universities can provide many scarce skills

-Do what you're doing now, i.e., keep your network going; build relationships; invite university faculty to your meetings; share information; talk
-Use teams to gather data /or/ hire a graduate student

-Build linkages - sponsor a masters thesis project

-Have Terri Trevino contact Dr. Freeman regarding volunteer assignments, especially regarding reimbursable expenses

-Dr Freeman got started providing analyses for the Forest Service by criticizing the social and economic well being portions of their impact statements. Over time, he and his colleagues worked with Forest Service teams, and they gradually formed problem solving teams. This led to on site checking out problems, building confidence, and finally developing defensible solutions. You gotta' have a good reason for what you do.
-Have learned how to take logic, create tools, and build defensible solutions.

Interview Date & Time: 12noon January 14, 1994
Location: Rm 225 Natural Resources Bldg, CSU, Ft Collins
Name: Don Hazlett, PhD
Title: Assistant Professor/ Research Scientist
Organization: Colorado State University & National Biological Survey
Background: International botanist

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-For Biodiversity we need to identify what is there now to establish baseline data.

-There are hierarchies of biodiversity.

-An initial inventory requires a minimum of two years to complete due to seasonal and climatological variations. This might involve four site visits per year.

-Biodiversity indicators - habitat, insects, animals, birds, rodents, rainfall, annuals (plants) indicate change, exotics and natives, & perennials
-Corridors are being planned and developed to provide access between isolated species populations

-Habitats may need to be maintained
-Monitoring - site surveys once or twice a year

-Alkaloidal screening of plants may provide indicators of pharmacological activity/ potential

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Taxonomy -classification and identification of organisms
-Entomology -study of insects

-Botany -study of plants
-Zoology -study of animals
-Manage towards desired conditions or goals, i.e., recreation or grazing

Interview Date & Time: 11am January 14, 1994
Location: Rm 113 Forestry Bldg, CSU, Ft Collins
Name: Dennis Dean, PhD
Title: Assistant Professor Natural Resource Information Systems
Organization: Colorado State University
Background: Research interests in application of GIS, artificial intelligence, expert systems, optimization, and other analytic techniques to public natural resource management.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Colorado partnership of federal/governmental agencies in Colorado

-How detailed information do you need and how much money do you have to spend?

-Course filter data - easily available, inexpensive, and provides a good view of the big picture. USFS timber maps just out.

-Fine filter data - is more accurate and progressively more expensive, i.e., on the ground inventory and monitoring. 1:24K quad maps are readily available and for Colorado we have these in our initial data set, rectified and in digital format at CSU. (Check with Bruce Keating)

-Managing spatial data
-CSU is developing simulation software
-Field level data

-Manual of Federal Geographic Data Products contains references on available data - USGS and EPA

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

-Ecosystem management concepts

-Spatial data management - GIS technician or manager - most new natural resource modeling software ties into GIS systems

-GPS - Global Positioning System - a lot of work is being accomplished using portable GPS equipment in the field.

-Data librarians to manage the data

-Retrieval of data

-Spatial modeling skills - Virginia Tech, Madison,WI, Berkeley, CA -School of Natural Resources, Geography, and Cartography - Internships for graduate students

-Ecosystem modeling skills to allow the "what if?" game and provide predictive models. CSU is developing Ecosystem management software.

Interview Date & Time: 10am, January 14, 1994
Location: Natural Resources Ecology Lab, Ft Collins, CO
Name: Ted Elliot, PhD
Title: Chairman, Committee to Develop Center for Ecosystem Science and Management
Organization: Natural Resources Ecology Lab, CSU
Background: Soils, PhD in Ecology, University of Georgia; National Science Foundation proposal for Center for Ecosystem Synthesis.

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

-Principles applied to biodiversity - "steady state"- sustainability

-Ecosystem science. We are developing a Center for Ecosystem Science and Management.

-Ecosystem Model - looking at the entire system

-Integrate to the level of a special unit. The unit may be a region or whatever.

-Nutrient cycling

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

(Dr. Elliot diagramed a modeling instrument to illustrate the various components of ecosystem analysis- attached.)

-Looking at the whole ecosystem there are various inputs, constraints, and an elements of sustainability.

-Process information - rates of growth, stream flow, controls on the flows; validate or test the model; measure components of the system.

-Site network - projection of current or future use with change in management or climate.

-Identifying gaps in the information.

-Locate the databases you need for data

-People that understand processes - primary science
-GIS experts

-Systems modelers - integrator of information - computer skilled - coordination skills - leadership skills - ability to think big, the big picture - good qualitative and math skills

-Site experts - the people that work their all the time
-Special geographic experts
-Climatology
-Planners - for establishing the objectives

-Ecosystem scientists

-People willing to work together to put the process together
-Interdisciplinary teams contributing to the systems scientist who understands the interactions
-Ecosystem science - simulation modeler - ecosystem simulation modeler - integrator of information - need the role on the ground

-Get a well experienced or a young person with a good mental attitude and good qualitative skills and train/educate them

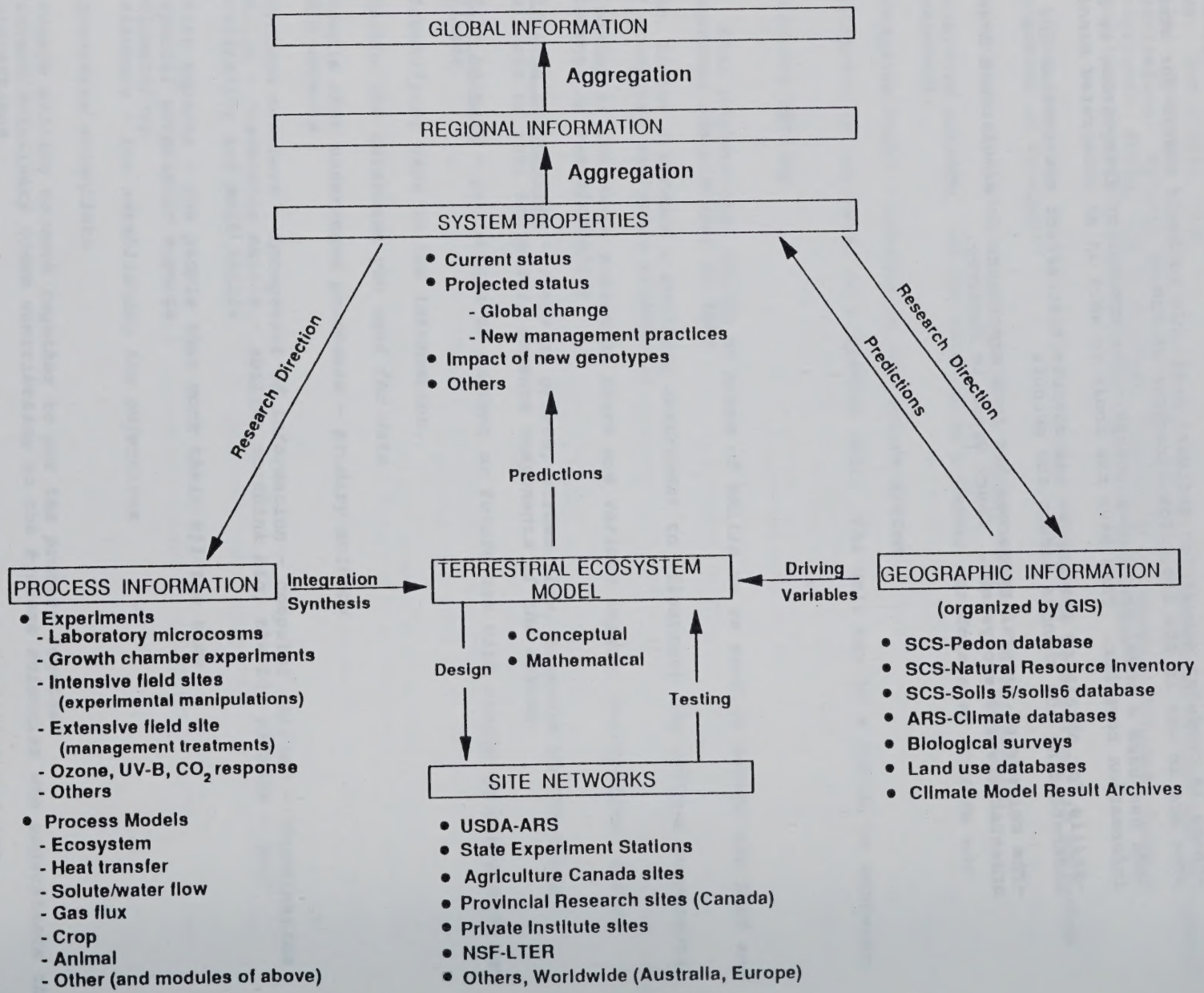
-There is computer simulation software available to build models for ecosystems - some are in use in the lab. Tom Kirschner at CSU

-EPA has used a model for global change - the concept of integration to bring the information together. They have the tools to work in an integrated manner.

-Skills for obtaining the inputs and outputs that affect the systems and understanding how changes affect the outputs

-The college of natural resources has some experience in simulations modeling oriented towards ecosystems. Chuck Greer in Forestry.

Information Requirements and Structure for Regional and Global Analysis



Adapted from Elliott & Cole, 1989, Ecology 70:1597-1602

Interview Date & Time: 3:30 p.m., February 1, 1994
Location: Telephone/Ft Collins, CO
Name: Dave Swift, PhD
Title: Research Scientist/ Associate Professor Rangeland Ecosystem Science
Organization: CSU - Natural Resources Ecology Lab (NREC)
Background: Large animal ecology

1. What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

Dr. Swift indicates that most of the scientists with the NREC are generalists with specialized backgrounds or a disciplinary home.

It is important for interdisciplinary team members to be able to appreciate other components of team efforts.

Interdisciplinary proposals require a broad viewpoint from a generalist's perspective.

Most specialists tend to push their own specialty area of interest. This is not really conducive to effective interdisciplinary interaction.

You need to provide a needs assessment based on the problem not the special interests of the individual.

2. What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

Look for personalities geared to the team environment.

Design your awards structure based upon the desired areas of productivity. Reward those that provide a good source of ideas, useful critical input, and a mindset towards teamwork.

Find people with a broad perspective of problems and teamwork.

Identify which problems require which types of people. Do they (participants) really need to be on the team? Is the group appropriate? The program people decide.

Look at how your money and your awards are allocated. This determines the overall direction of your efforts.

You need a mix of people types on your teams, e.g., visionaries, empirical skills, mathematical skills including modeling, general ecologists with gestalt understanding, systems interaction skills, qualitative skills, and conceptual (not field) skills.

Team interactions transcend from the conceptual levels down to the on the ground level.

View the primary problems through problem analysis and look for factors such as constraints to productivity.

You need generalists with a specialist area of discipline. They need to be able to serve double duty as both generalist and a subject matter expert.

Conventional academic graduate level programs produce highly specialized individuals that don't tend to be prepared to work in the interdisciplinary team setting. At the NREC, the graduate students work with from 3 to 5 or 6 senior scientists in mentoring relationships to produce well rounded graduates that are prepared for interdisciplinary teamwork. Again, look for teamwork skills or background.

Interview Date & Time: 1/13/94
Location: Cody
Name: Mark Sawyer
Title: County Planner
Organization: Park County
Background:

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

- BLM basically has staff it needs
- don't make everyone a generalist - but have someone to pull it together
- maintain level of expertise (professionalism) - so respected by public - maintain training level - keep people out on the ground - field experience
- information sharing with landowners - wildlife management - data (migration corridors)
- design assistance more locally available
- economist needs to come into community to do real evaluation - so does sociologist
- group planning - get information out, education - should be constant info in local paper about BLM (positive)

What professional skills or mixes of skills do we need to manage the land and resources administered by BLM?

- PR+ person - community coordinator - full time focus - information translator - social skills - listen well - liaison/ coordination person
- Landscape architect capability would benefit local landowners

Other comments

- ESM means closer coordination with local planning
- using people outside their expertise hurts agency credibility - eg. suddenly telling a forester that he is a wildlife biologist
- promote that we have top level experts
- county could benefit from whole array of skills
- share mapping
- communities that rely on public lands don't understand or are working on misinformation
- break down rumors/ build trust
- people want information- regular informative articles and annual report
- build perception that everything is not being done behind closed doors

AGENCY/ORGANIZATION: NATRONA COUNTY PARKS

DATE/TIME: January 20, 1994 10:30 A.M.

PERSONS INTERVIEWED: SAM WEAVER, PARKS DIRECTOR
KELLY ESTES, RECREATION PLANNER

INTERVIEWERS: Bill Mortimer, Jon Johnson

QUESTIONS:

WHAT KNOWLEDGE OR ABILITIES DOES BLM NEED TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

(Sam did not have any specific "knowledge" in mind - his comments and our discussions were more philosophical.)

Sam Weaver is concerned about how BLM would treat recreation needs (under ecosystem management. BLM will need all the knowledge we currently have. (Sam's degree is in Forest Ecology.)

BLM needs to look at the holistic approach - the historical aspect of ecosystems: How did we get here? Where do we want to be? Can we do that?

BLM needs "concrete definitions of what ecosystem management means" and a definitive plan.

Comments: People are wondering where BLM is going (with its ecosystem management initiative). The longer the concept remains nebulous, the more skepticism there will be by the public.

BLM needs to plainly and simply define "ecosystem" and the "ecosystem concept" so <u>everyone</u> understands what we are talking about.

Comments: Have a diverse group of people review these definitions to insure they are "understandable".

BLM needs to take a more holistic approach and get away from "tunnel vision".

BLM needs to use other agencies' expertise.

BLM needs to conduct "strategic planning".

BLM needs people who <u>care</u> about the land.

BLM needs an adequate number of people to conduct monitoring.

Comments: BLM should look into using college and university instructors and students for monitoring activities on public land.

The Government could fund research by colleges and universities to assist the monitoring effort.

BLM could involve high school and elementary students in ecosystem/resource management projects, i.e., tree planting.

BLM needs to develop "standardized" criteria for <u>base resource data/information</u> for each "ecosystem" - ecology, geology, etc..

Comments: There must be ready access to this information by everyone - the public, agencies, etc.. It is the government's responsibility to make such information readily accessible. Also, whoever keeps or maintains

such information must be viewed by the public as a neutral party. There may need to be some sort of "Environmental Information Clearing House". This data/information could be kept in public libraries or in "public schools" (libraries?).

BLM needs a "mechanism" or "group" to gather (base resource) information and needs to keep such information "standardized" and "updated".

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LANDS AND RESOURCES ADMINISTERED BY BLM?

Sam was concerned about how we were going to get all the users' input. We already have a hard time getting people to come to meetings, especially if there is travel involved. He recommended teleconferencing or video conferences to help solve the travel problem. We can burn folks out with meetings.

BLM needs GIS expertise.

BLM needs plant ecologists.

BLM needs neutral, trained facilitators with no "vested interests" to "facilitate" our planning and management activities.

BLM people need skills to display and present information "as simplistic as possible".

INTERVIEW DATE & TIME: 21 Jan 1994, 11am
LOCATION: BLM, Cheyenne
NAME: Claire Moseley
TITLE:
ORGANIZATION: RMOGA
BACKGROUND: Federal land use planning concerning oil and gas

WHAT KNOWLEDGE OR ABILITIES DO WE NEED FOR BLM TO BE A PARTNER IN ECOSYSTEM MANAGEMENT IN WYOMING?

Coordinate with the USGS, DOE, WGA, BOM. Encourage them to become involved in the planning process.

WHAT PROFESSIONAL SKILLS OR MIXES OF SKILLS DO WE NEED TO MANAGE THE LAND AND RESOURCES ADMINISTERED BY BLM?

It may be reasonable for the BLM to utilize "facilitators in an effort to separate science, policy, politics, and eliminate vote counting.

Land use planning must not be delegated to inexperienced personnel, only the best, most experienced personnel should be assigned this important task.

Personnel with on-hands experience in resource program implementation (such as oil and gas exploration and development) should be used to facilitate analysis of cumulative effects and determination of reasonable mitigation.

Interview Date & Time:

Location:

Name: *Rocks Rogers*

Title: *Biologist*
Organization: *National Elk Refuge*
(307) 733-9212

Background: *Wildlife*

What knowledge or abilities do we need for BLM to be a partner in ecosystem management in Wyoming?

What Professional skills or mixes of skills do we need to manage the land resources administered by BLM?

Skills sharing with other agencies for special projects, skills and knowledge.
Reporting results of monitoring.
Getting other agency and community involvement.
More focus on habitat.
More monitoring.

February 17, 1994
Wyoming State Geologic Survey Building
Gary Glass Director
Wyoming State Geologic Survey

Mr. Glass have been director of the State Geologic Survey for 13 years. He also serves on the Wyoming Oil and Gas Commission. Mr. Glass and his staff have been directly involved in the review of BLM planning and environmental documents for over 10 years. They routinely respond to BLM with comments and recommendations on technical concerns during the review process.

Overall, Mr. Glass feels the BLM has suffered from a lack of expertise in economic geology. Generally, the Bureau is not able to accurately depict market trends and estimate overall market conditions for a given mineral commodity. Often times we grossly over or under estimate current market conditions and trends for gemstones, other solid minerals, oil, and gas. Most often we are guilty of not responding to the Survey's comments on various documents. Mr. Glass believes our cooperative efforts could be improved. He mentioned that BLM could do a better job networking to encourage early involvement from the public and other agencies in the planning and decision-making process.

The following is a listing of knowledge and professional skills he felt were important to enhance as the BLM moves into Ecosystem Management. Mr. Glass emphasized the importance of having access to specific skills when developing the BLM planning documents. He encourages BLM to look beyond traditional boundaries and expand upon the partnering approach necessary in ecosystem management. He also stresses the importance of separating the technical review and coordination meetings from traditional public meetings.

1. *coal, oil and gas, construction variety, and hard rock geologists*
2. *specific economists (recreation, social, minerals, agricultural)*
3. *team players*
4. *public sales*
5. *mineral appraisers*
6. *consensus building*
7. *mineral development forecasting*
8. *mining engineers*
9. *geologists and engineers with specific industry expertise*
10. *planning skills*
11. *market analysis*
12. *writing for the public with facts*
13. *communication skills (internal, external, informal...)*
14. *networking skills*

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